2004

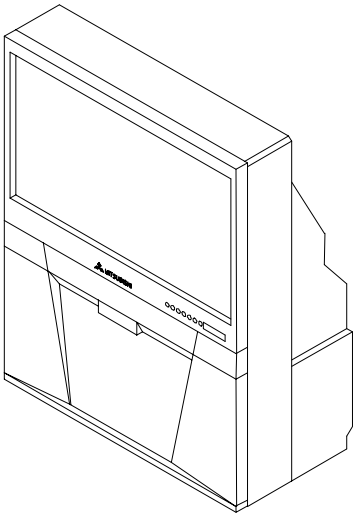
MITSUBISHI ELECTRIC

Service Manual

PROJECTION TELEVISION

V25 / V25+ / V25++ CHASSIS

WS-48515



V25 MODELS
WS-48515
WS-55515
WS-65515

V25+ MODELS
WS-55615
WS-65615
WS-73615

V25++ MODELS
WS-55815
WS-65815

CAUTION:
Before servicing this chassis, it is important that the service person read the "SAFETY PRECAUTIONS" and "PRODUCT SAFETY NOTICE" contained in this manual.

SPECIFICATIONS

- **Power Input** : AC 120V, 60Hz
- **Power Usage** : 275W
  300W [WS-65815/ WS-73615 only]
- **Frequency Range** : VHF 54 ~ 470MHz
  UHF 470 ~ 806MHz
- **Antenna Input** : VHF/UHF 75Ω unbalanced
  1 NTSC /ATSC /QAM
  1 NTSC for PIP
- **CRT Size** : [7 inches]
  : [9 inches] WS-65815/ WS-73615 only
- **High Voltage** : 32.0kV (at 0A)
- **Cabinet Weight and Dimensions (Refer to page 5)**
- **Speakers (8 Ohms 10W)**
  : 2-5" full range [WS-48515]
  : 2-6" full range [WS-55515 / WS-65515]
  : 2-6" coaxials [WS-55615 / WS-65615 / WS-73615]
  : 2-5"x7" coaxial [WS-55815 / WS-65815]
- **Input Level** : VIDEO IN JACK (RCA Type)
  1.0Vp-p 75Ω unbalanced
  : AUDIO IN JACK (RCA Type)
  -4.7dBm 43kΩ unbalanced
  : S-VIDEO IN JACK
  (Y/C separate type)
  Y:1.0 Vp-p C:0.286Vp-p(BURST)
  75Ω unbalanced
  : COMP / Y, Cr, Cb (RCA Type)
  Y: 1.0 Vp-p Cr, Cb: 700mVp-p
- **Output Level** : VIDEO OUT JACK (RCA Type)
  1.0Vp-p 75Ω unbalanced
  : AUDIO OUT JACK (RCA Type)
  -4.7dBm 4.7kΩ unbalanced
- **Digital Interface** : IEEE-1394 I/O Jacks
  : AC-3 Digtal Audio Output
  : HDMI
  : 4 Memory Card Reader Inputs
  (V25++ Only)
  : CableCARD
  : System 5 IR
  : USB Service Port

- Design specifications are subject to change without notice.

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INTRODUCTION

This service manual provides service instructions for the V25, V25+ and V25++ PTV chassis types. The specific models for each chassis type are listed below. Service personnel should read this manual thoroughly before servicing these chassis.

V25 Chassis	V25+ Chassis	V25++ Chassis
WS-48515	WS-55615	WS-55815
WS-55515	WS-65615	WS-65815
WS-65515	WS-73615	

This service manual includes:

1. Assembly and disassembly instructions for the front and rear cabinet components.
2. Servicing of the Lenticular Screen and Fresnel Lens.
3. Servicing printed circuit boards (PCBs).
4. CRT replacement procedure.
5. Electrical adjustments.
6. Chip parts replacement procedures.
7. Circuit path diagrams.

The parts list section of this service manual includes:

1. Electrical parts.
2. Cabinet and screen parts.

Schematic and block diagrams of the above listed models are included in this service manual for better understanding of the circuitry. PCB drawings are also included for easy location of parts and test points.

Cabinet Weight and Dimensions

Model	Weight	Height	Width	Depth	Spkrs
WS-48515	172 lbs	49 in	44.5 in.	24 in.	5" 10W
WS-55515	213 lbs	53 in	56 in	34 in	6" 10W
WS-55615	213 lbs	50.5 in	51 in	28 in	6" 10W
WS-55815	195 lbs	50.5 in	51 in	27 in	5x7" 10W
WS-65515	327 lbs	62 in	59 in	28 in	6" 10W
WS-65615	327 lbs	62 in	59 in	28 in	6" 10W
WS-65815	276 lbs	62 in	58 in	28 in	5x7" 10W
WS-73615	313 lbs	66 in	66 in	30 in	6" 10W

• Weight and Dimensions are approximate

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in television receivers have special safety related characteristics. These characteristics are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc.

Replacement parts which have special safety characteristics are identified in this service manual.

Electrical components having such features are identified by shading on the schematic diagram and by **bold type** in the parts list of this service manual. **The replacement for any safety part should be identical in value and characteristics.**

SAFETY PRECAUTIONS

NOTICE: Observe all cautions and safety related notes located inside the receiver cabinet and on the receiver chassis.

WARNING:

1. Operation of this receiver outside the cabinet or with the cover removed presents a shock hazard from the receiver's power supplies. Work on the receiver should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment.
2. Do not install, remove or handle the picture tubes in any manner unless shatterproof goggles are worn. People not so equipped should be kept away while the picture tube is being handled. Keep the picture tube away from the body while handling.
3. When service is required, observe the original lead dress. Extra precaution should be taken to assure correct lead dress in the high voltage area. Where a short-circuit has occurred, replace those components that indicate evidence of overheating.

X-Radiation warning

The surface of the cathode ray tubes (CRTs) may generate X-Radiation, so take proper precautions when servicing. It is recommended that a lead apron be used for shielding while handling the CRT. Use this method if possible.

When replacing the CRTs, use only the designated replacement part since it is a critical component with regard to X-Radiation. High voltage must be set as prescribed under the section titled Electrical Adjustments.

Leakage current check

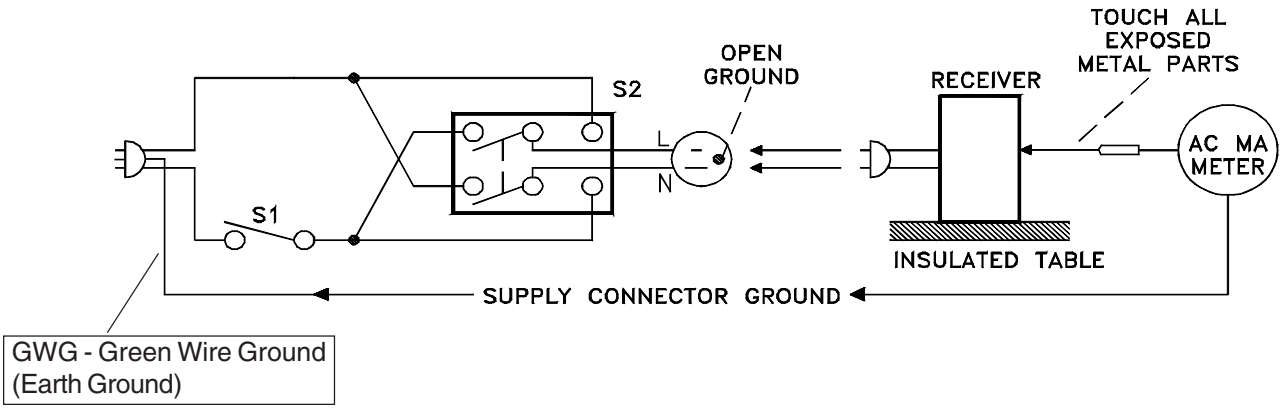
Before returning the receiver to the customer, it is recommended that leakage current be measured according to the following methods.

1. *Cold Check*

   With the alternating current (AC) plug removed from the AC source, place a jumper across the two AC plug prongs. Connect one lead of an ohm meter to the AC plug and touch the other lead to each exposed metal part (i.e. antennas, handle bracket, metal cabinet, screw heads, metal overlay, control shafts, etc.), particularly any exposed metal part that has a return path to the chassis. The resistance of the exposed metal parts having a return path to the chassis **should be a minimum of 1Mega Ohm**. Any resistance below this value indicates an abnormal condition and requires corrective action.

2. *Hot Check ...Use the circuit shown below to perform the hot check test.*

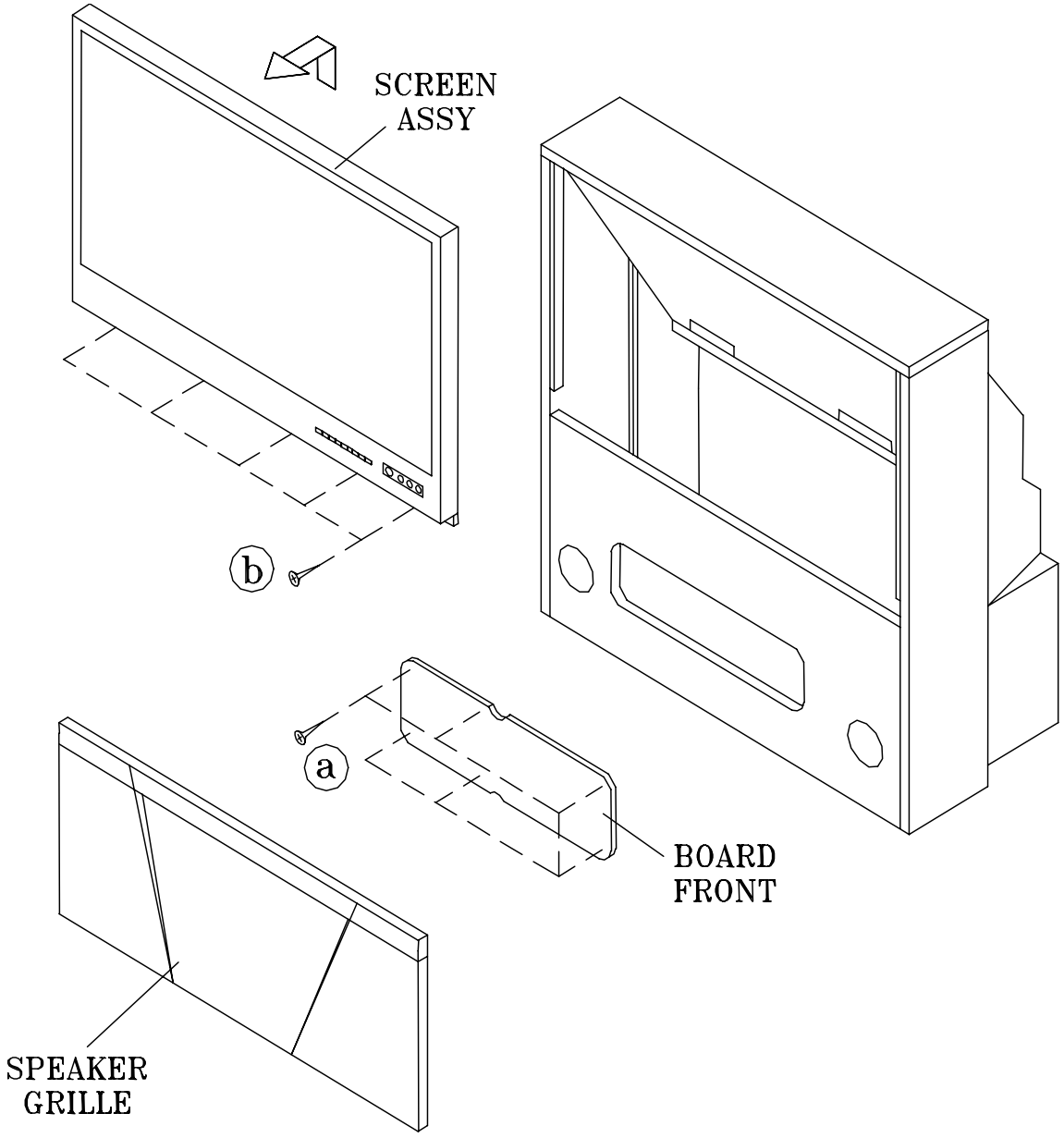
   1. Keep switch S1 open and connect the receiver to the measuring circuit. Immediately after connection, and with the switching devices of the receiver in their operating positions, measure the leakage current for both positions of switch S2.
   2. Close switch S1, energizing the receiver. Immediately after closing switch S1, and with the switching devices of the receiver in their operating positions, measure the leakage current for both positions of switch S2. Repeat the current measurements of items 1 and 2 after the receiver has reached thermal stabilization. **The leakage current must not exceed 0.5 milliampere (mA).**



CABINET DISASSEMBLY (FRONT VIEW)

WS-48515

***Refer to the Parts List for Part Numbers**



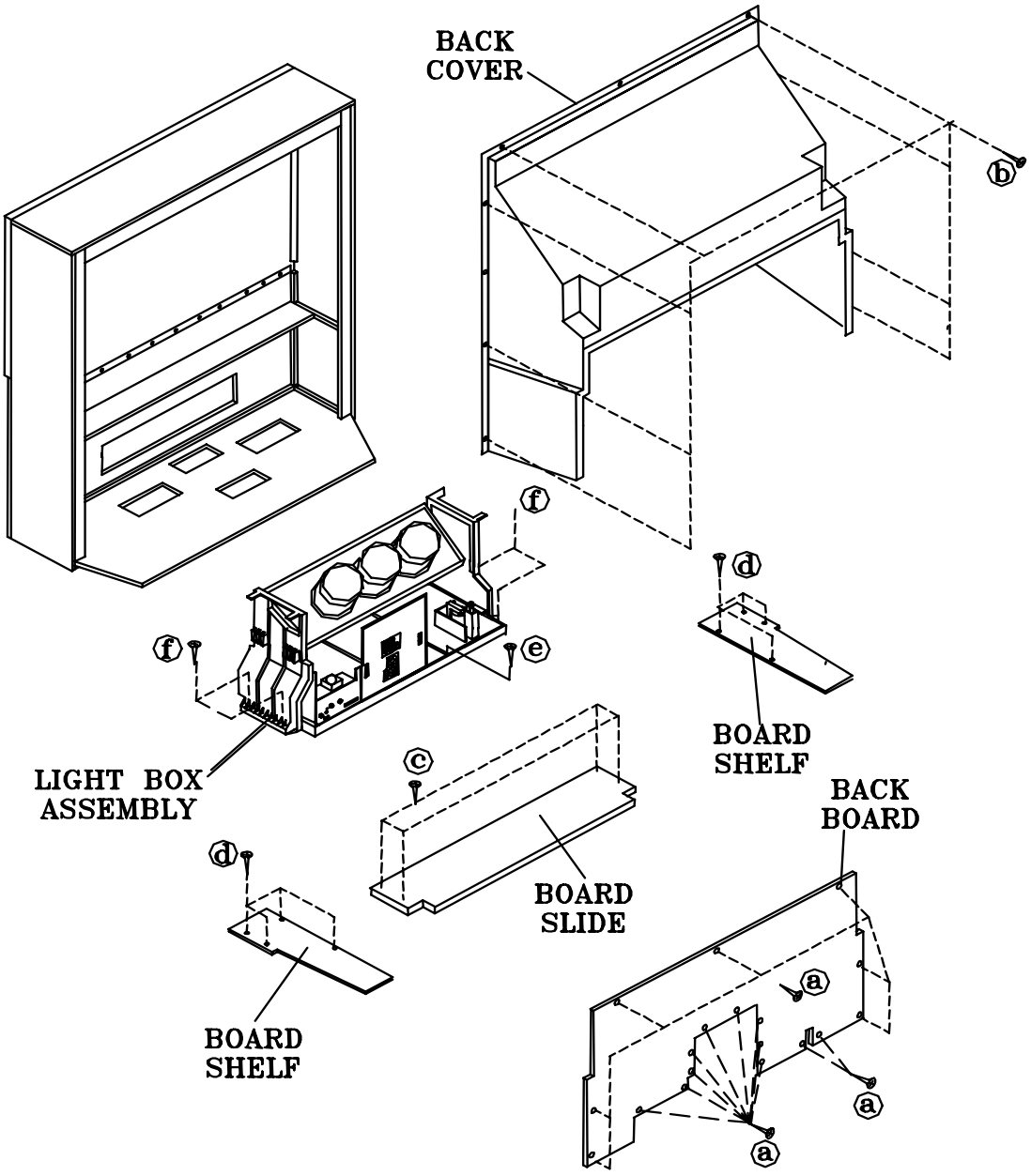
Front Cabinet Disassembly

1. Remove the Speaker Grille by pulling forward.
2. Remove the Board Front by removing 6 screws (a).
3. Remove 4 screws (b) holding the Screen Assembly.
4. Lift the Screen Assembly up and away from the cabinet.

CABINET DISASSEMBLY (REAR VIEW)

WS-48515

***Refer to the Parts List for Part Numbers**



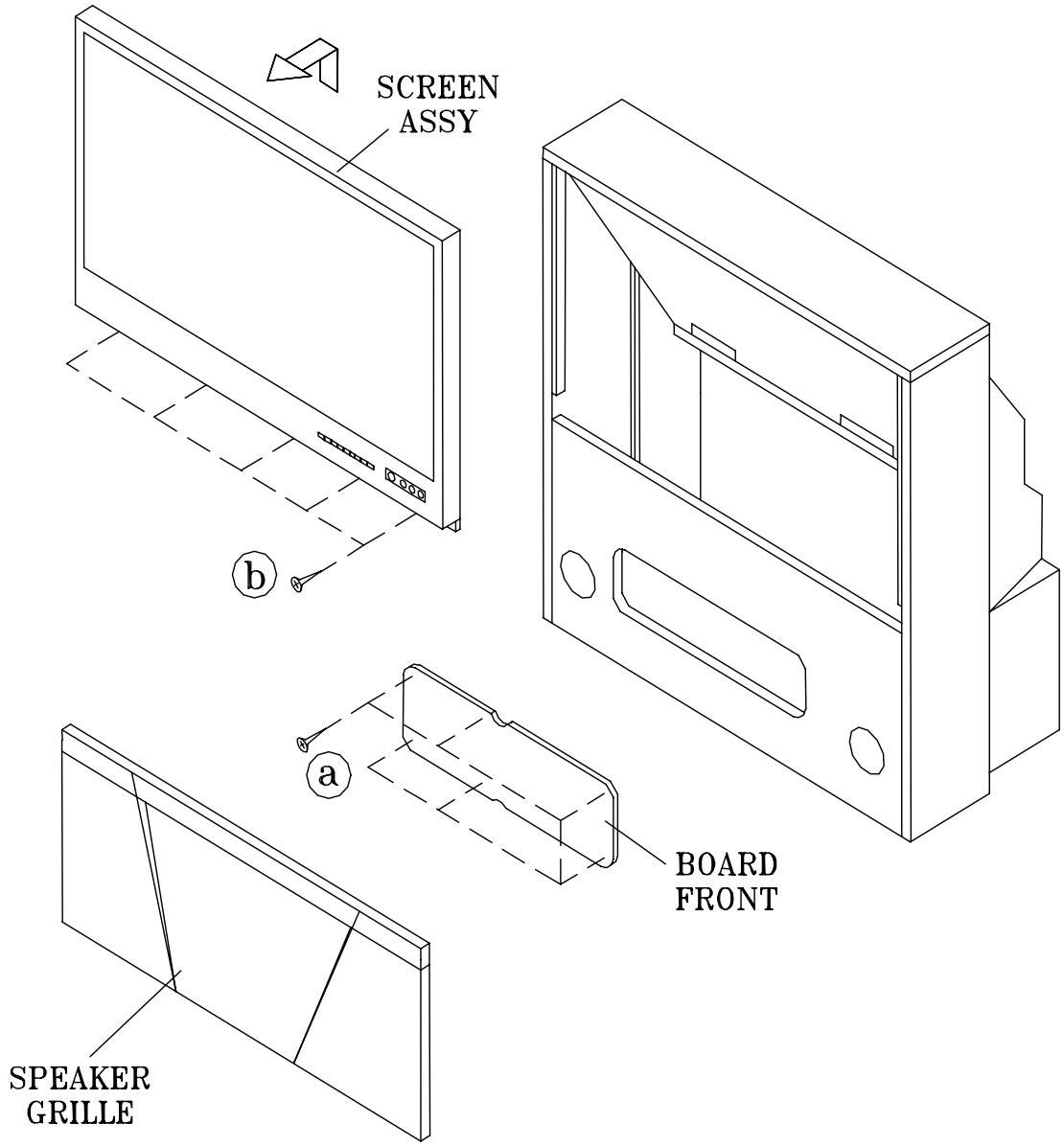
Rear Cabinet Disassembly

1. Remove the Back Board by removing 18 screws (a).
2. Remove the Back Cover by removing 8 screws (b).
3 Remove 4 screws (c) to remove the Board Slide.
4. Remove 4 screws (d) to remove the Board Shelves.
5. Remove screw (e) holding the chassis.
6. Remove 4 screws (f) securing the Light Box Assembly.
7. Be certain that all cables and connectors between the Light Box Assembly and external items are disconnected (e.g. speaker plugs, etc.), including the USB and 1394 connectors from the Card Reader to the DM.
8. Slide the Light Box Assembly from the cabinet.

CABINET DISASSEMBLY (FRONT VIEW)

WS-55515 / WS-65515 / WS-55615 / WS-65615

***Refer to the Parts List for Part Numbers**



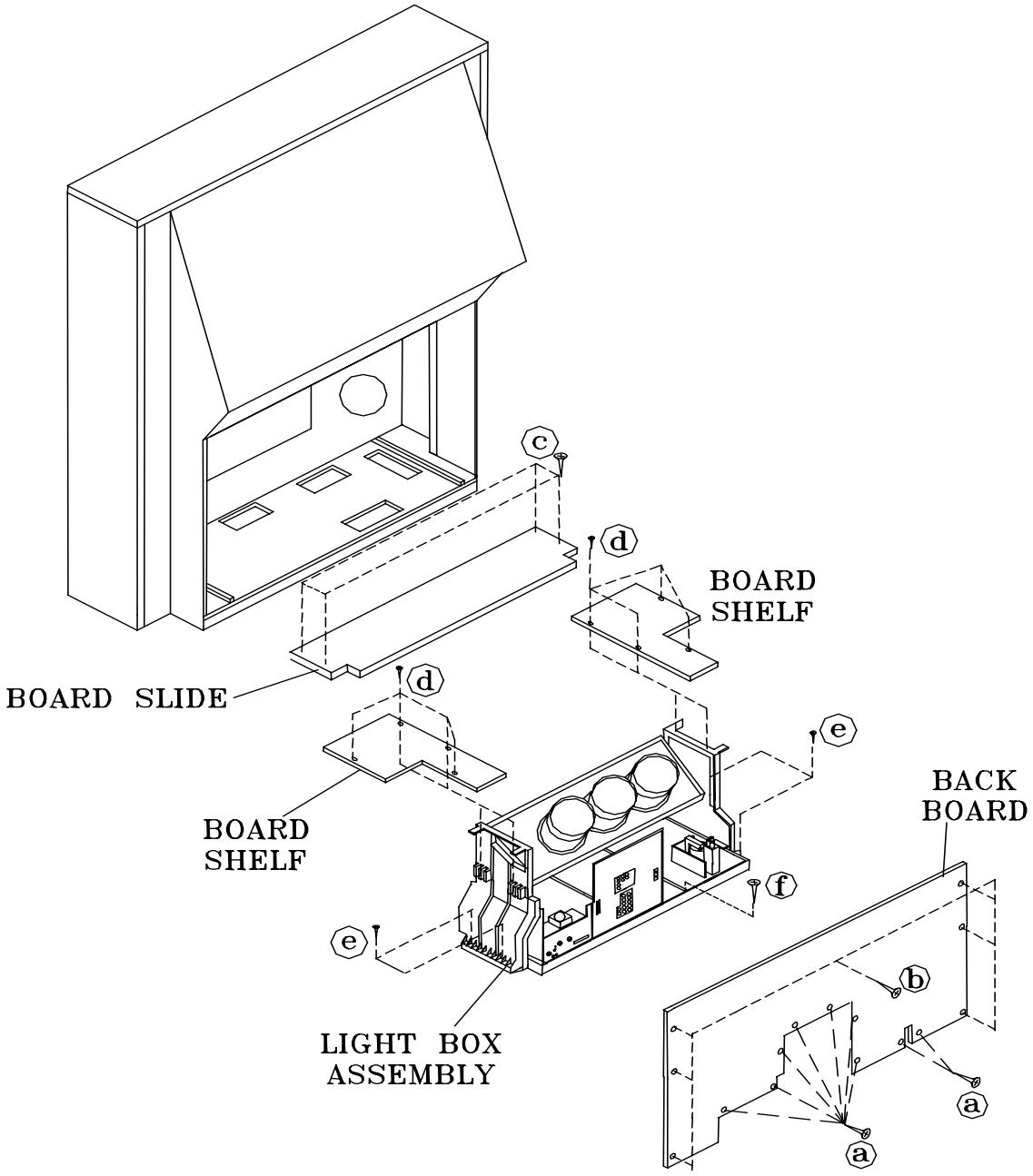
Front Cabinet Disassembly

1. Remove the Speaker Grille by pulling forward.
2. Remove the Board Front by removing 6 screws (a).
3. Remove the 5 screws (b) holding the Screen Assembly.
4. Unplug the cables to the Control Panel and the Front Panel Inputs.
4. Lift the Screen Assembly up and away from the cabinet.

CABINET DISASSEMBLY (REAR VIEW)

WS-55515 / WS-65515 / WS-55615 / WS-65615

***Refer to the Parts List for Part Numbers**



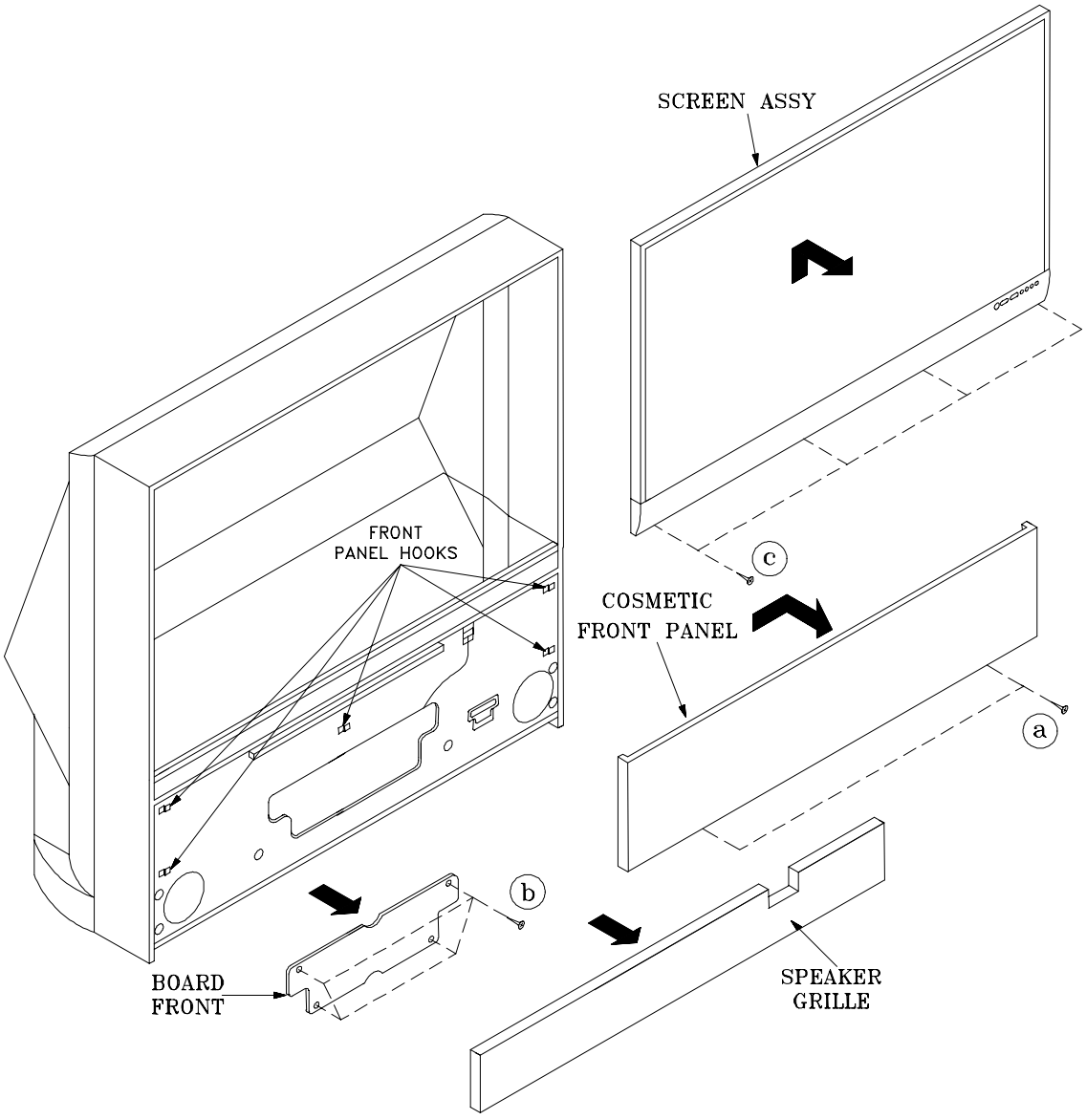
Rear Cabinet Disassembly

1. Remove 9 screws (a) and 6 screws (b) holding the Back Board.
2. Remove 4 screws (c) holding the Board Slide
3. Remove the 4 screws (d) holding each Board Shelf.
4. Remove 1 screw (f) holding the chassis.
5. Remove 4 screws (e) securing the Light Box Assembly.
6. Be certain that all cables and connectors between the Light Box Assembly and external items are disconnected (e.g. speaker plugs, etc.), including the USB and 1394 cables from the Card Reader.
7. Slide the Light Box out the rear of the Cabinet.

CABINET DISASSEMBLY (FRONT VIEW)

WS-55815

***Refer to the Parts List for Part Numbers**



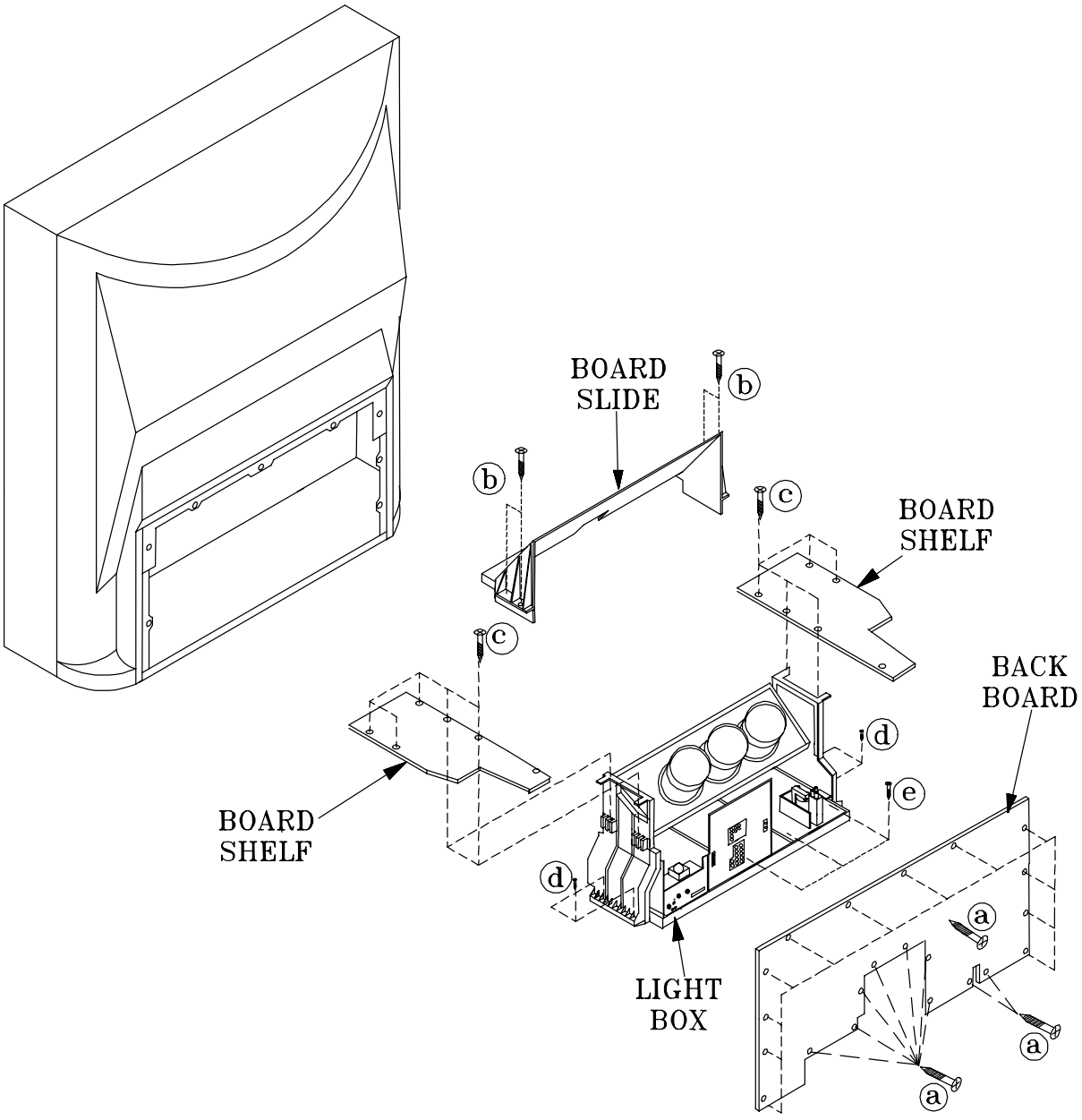
Front Cabinet Disassembly

1. Remove the Speaker Grille by pulling forward.
2. Remove 2 screws (a) securing the Front Panel.
3. Slide the Front Panel 1 inch to the right, then pull away from the TV.
4. Remove 4 screws (b) to remove the Board Front.
5. Unplug the the connectors to the Control Panel.
6. Remove the 4 screws (c) securing the Screen Assembly.
7. Pull screen bottom away from cabinet 15deg, then up and away from the cabinet.

CABINET DISASSEMBLY (REAR VIEW)

WS-55815

***Refer to the Parts List for Part Numbers**



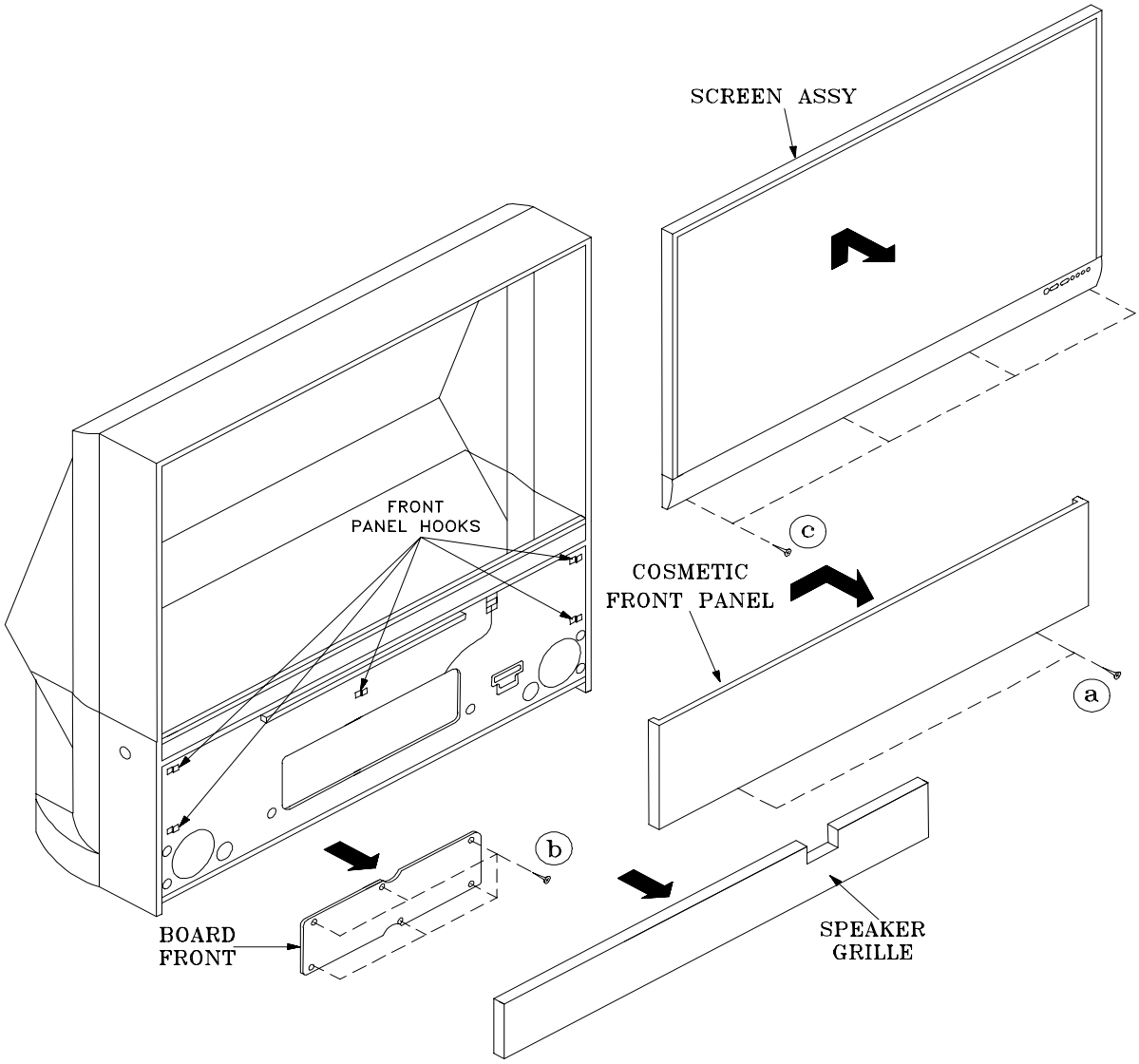
Rear Cabinet Disassembly

1. Remove 21 screws (a) holding the Back Board.
2. Remove 4 screws (b) holding the Board Slide
3. Remove the 5 screws (c) holding each Board Shelf.
4. Remove 4 screws (d) and 3 screws (e) securing the Light Box Assembly.
5. Be certain that all cables and connectors between the Light Box Assembly and external items are disconnected (e.g. speaker plugs, etc.), including the USB and 1394 cables from the Card Reader..
6. Slide the Light Box out the rear of the Cabinet.

CABINET DISASSEMBLY (FRONT VIEW)

WS-65815

***Refer to the Parts List for Part Numbers**



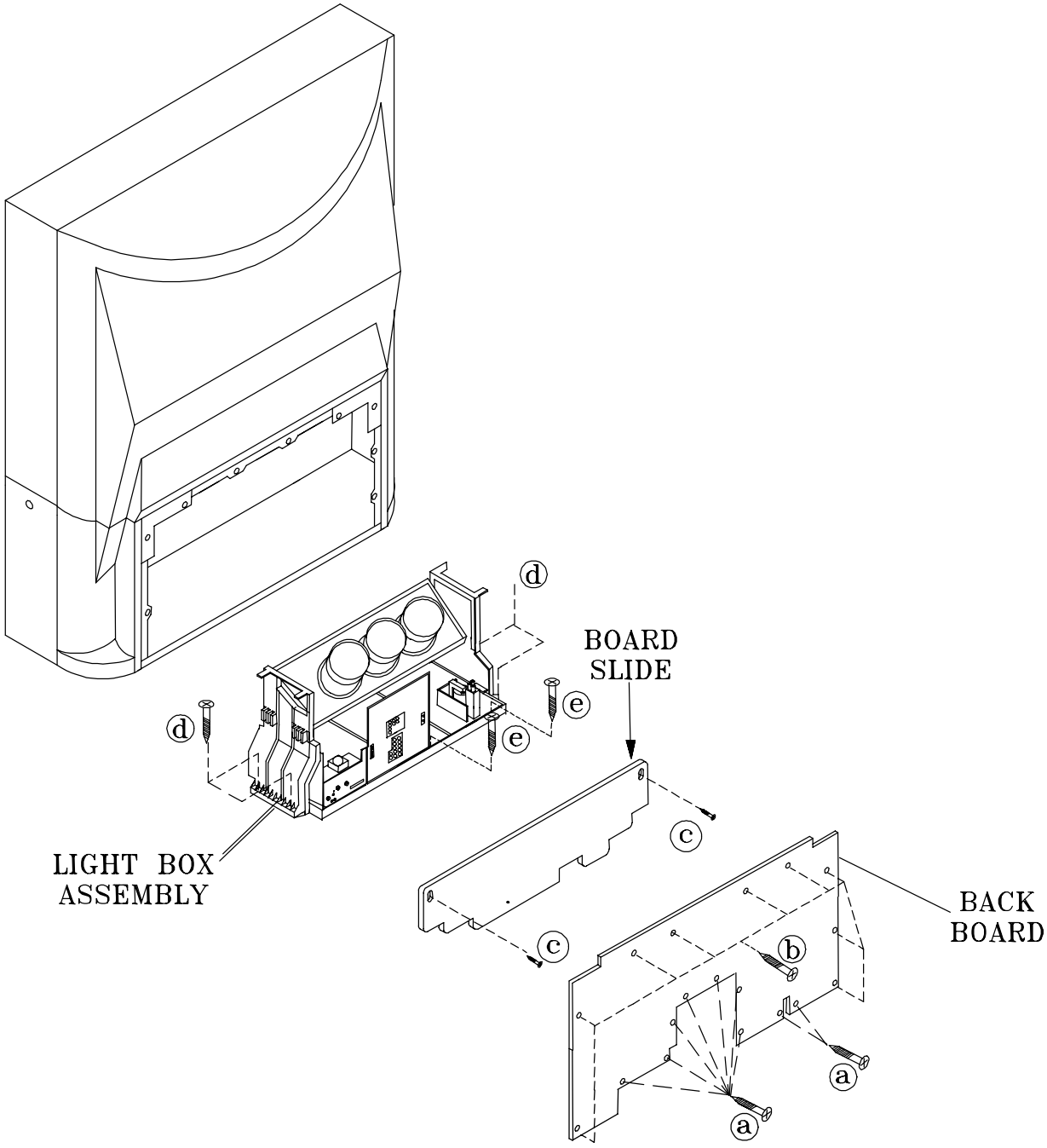
Front Cabinet Disassembly

1. Remove the Speaker Grille by pulling forward.
2. Remove 2 screws (a) securing the Front Panel.
3. Slide the Front Panel 1 inch to the right, then pull away from the TV.
4. Remove 6 screws (b) to remove the Board Front.
5. Unplug the connectors to the Screen Assembly.
6. Remove the 4 screws (c) securing the Screen Assembly.
7. Pull screen bottom away from cabinet 15deg, then up and away from the cabinet.

CABINET DISASSEMBLY (REAR VIEW)

WS-65815

***Refer to the Parts List for Part Numbers**



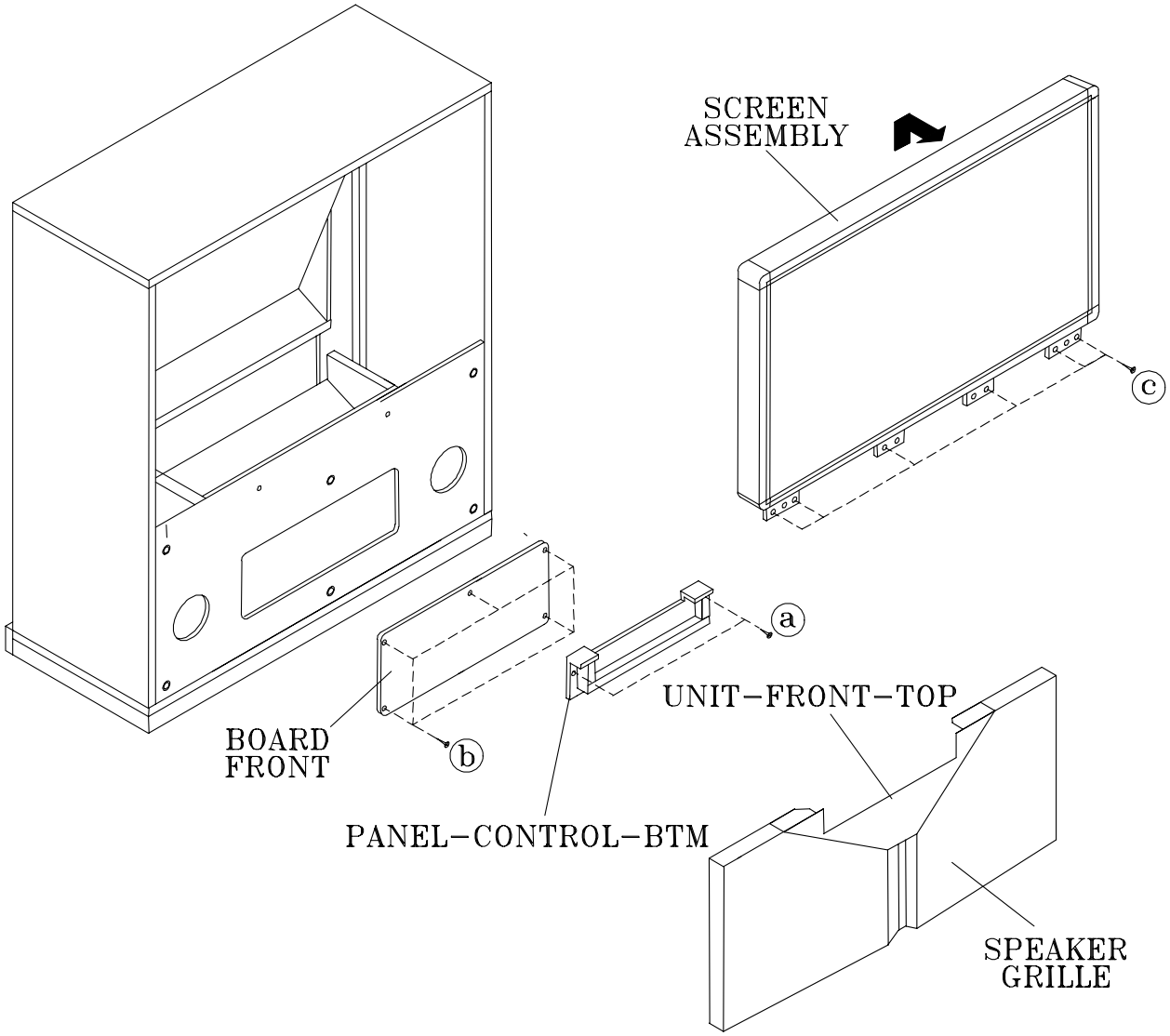
Rear Cabinet Disassembly

1. Remove 9 screws (a) and 9 screws (b) holding the Back Board.
2. Remove the 2 screws (c) holding the Board Slide.
3. Remove the 3 screws (d) and 2 screws (e).

CABINET DISASSEMBLY (FRONT VIEW)

WS-73615

***Refer to the Parts List for Part Numbers**



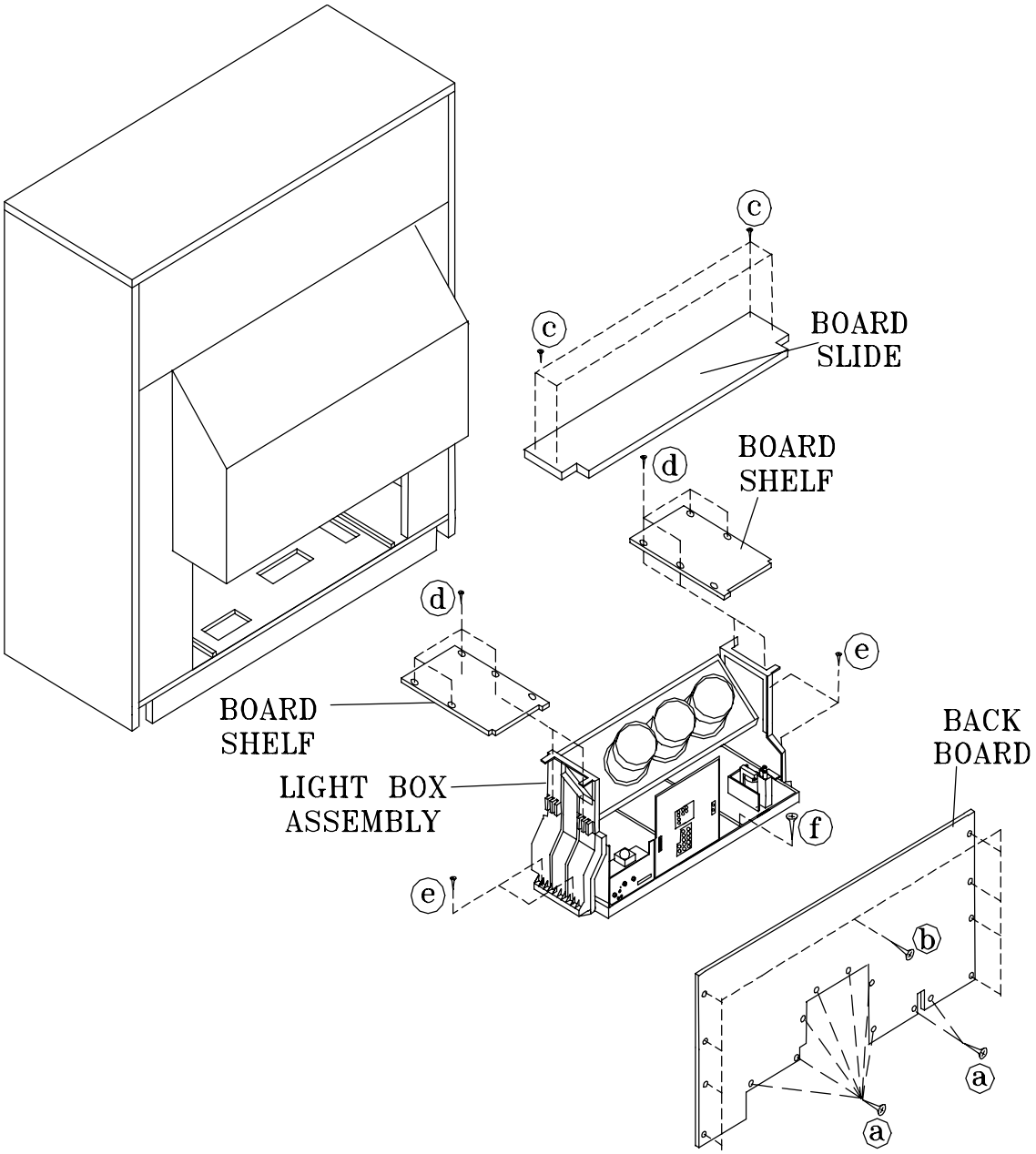
Front Cabinet Disassembly

1. Remove the Speaker Grille by pulling forward.
2. Remove 2 screws (a) securing the PANEL-CONTROL-BTM
3. Remove 5 screws (b) to remove the Board Front.
4. Remove the 6 screws (c) securing the Screen Assembly.
5. Lift the Screen Assembly up and away from the cabinet.

CABINET DISASSEMBLY (REAR VIEW)

WS-73615

***Refer to the Parts List for Part Numbers**



Rear Cabinet Disassembly

1. Remove 9 screws (a), 6 screws(b) holding the Back Board.
2. Remove the 4 screws (c) holding the Board Slide.
3. Rmove 4 screws (d) securing each Board Shelf.
3. Remove the 4 screws (e) and a screw (f) securing the Light Box Assembly.
4. Disconnect cabling to the front panel (Control Panel, Speakers, Inputs, etc.), including the USB and 1394 cables from the Card Reader.
4. Slide the Light Box out the rear of the Cabinet.

SERVICING THE LENTICULAR SCREEN AND FRESNEL LENS

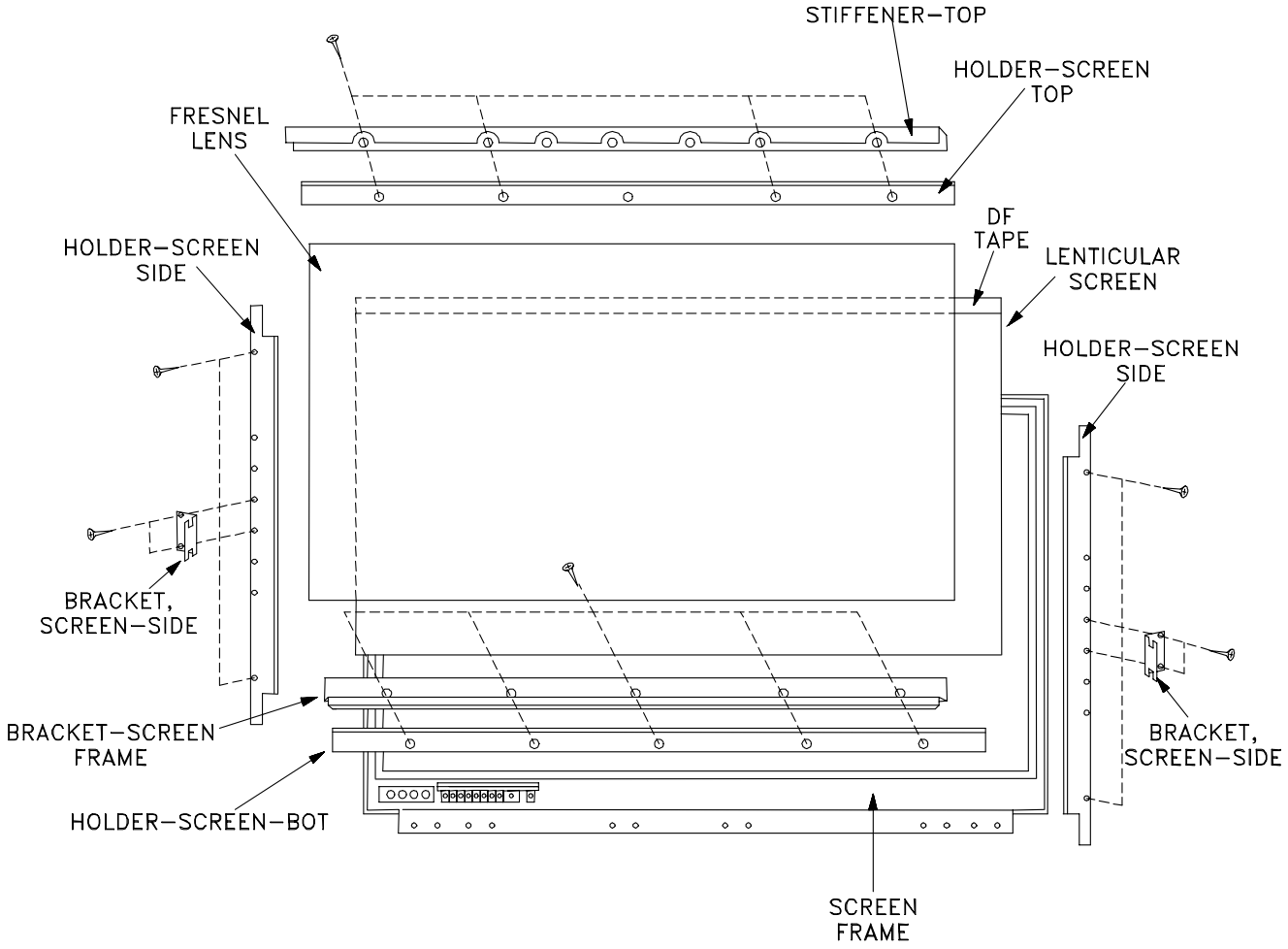
CAUTION: **Wear gloves** when handling the Lenticular Screen and Fresnel Lens. This prevents cuts and finger prints. **Do not place Fresnel Lens in the sun**. This may cause fire and heat related injuries.

WS-48515

Lenticular Screen and Fresnel Lens Removal

1. Remove the screen assembly shown in the Cabinet Disassembly procedure.
2. Remove the Top, Bottom and Side Screen Holders.
3. Carefully lift the Lenticular Screen and Fresnel Lens combination from the Screen Frame assembly.

Note: When separating the Lenticular Screen from the Fresnel Lens, use caution while prying the Screen and Lens apart. Use a slot type screw driver, and remove the pressure sensitive double sided tape.



SERVICING THE LENTICULAR SCREEN AND FRESNEL LENS

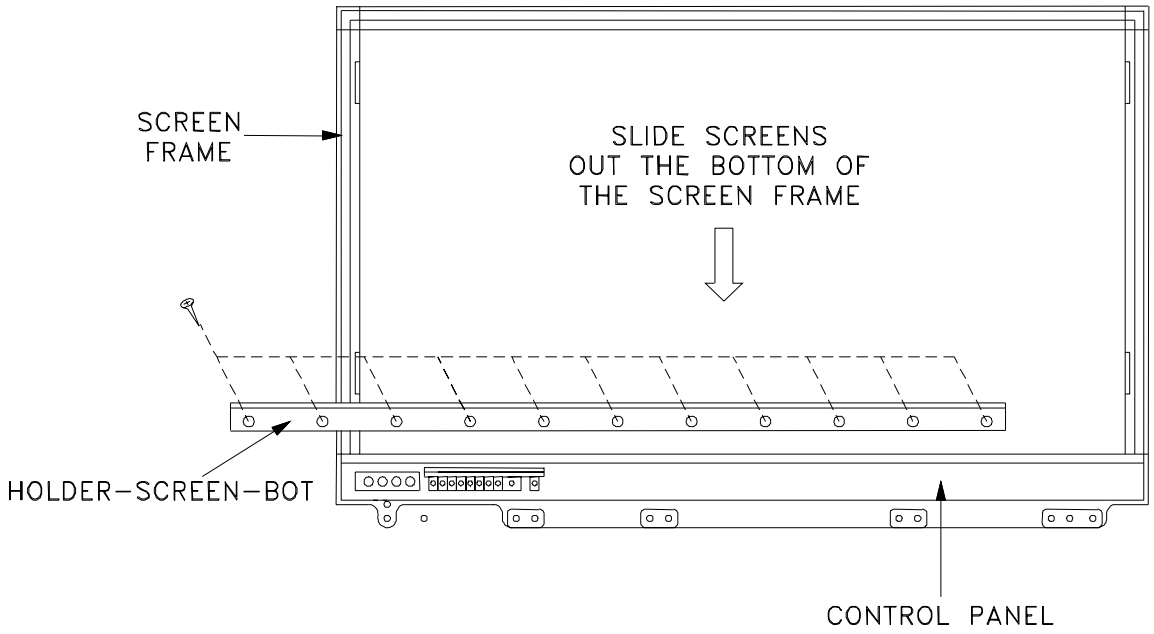
WS-55515 / WS-65515

CAUTION: **Wear gloves** when handling the Lenticular Screen and Fresnel Lens. This prevents cuts and finger prints. **Do not place Fresnel Lens in the sun**. This may cause fire and heat related injuries.

1b. Lenticular Screen and Fresnel Lens Removal

1. Remove the screen assembly as shown in the Cabinet Disassembly procedure.
2. Remove the HOLDER-SCREEN-BOTTOM.
3. Carefully slide the Lenticular Screen and Fresnel Lens combination from the upper Screen Frame Assembly.

Note: When separating the Lenticular Screen from the Fresnel Lens, use caution while prying the Screen and Lens apart. Use a slot type screw driver, and remove the pressure sensitive double sided tape.



1b. Installing the Fresnel Lens and Lenticular Screen

1. Insert the Lenticular Screen and Fresnel Lens combination into the upper Screen Frame.
2. Install the HOLDER-SCREEN-BOTTOM, install the end screws first. .

SERVICING THE LENTICULAR SCREEN AND FRESNEL LENS

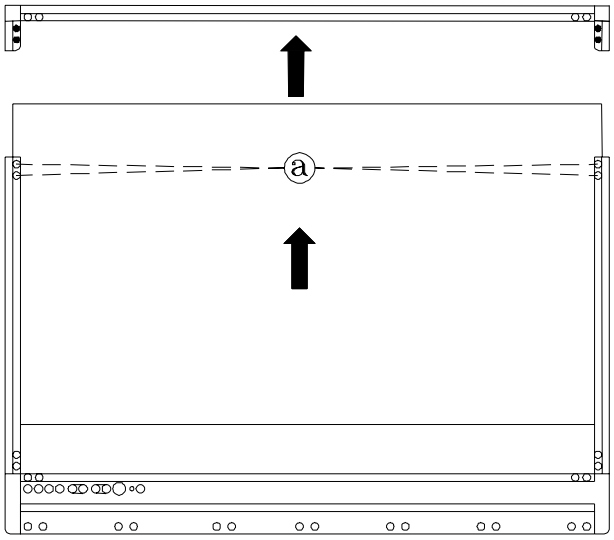
CAUTION: **Wear gloves** when handling the Lenticular Screen and Fresnel Lens. This prevents cuts and finger prints. **Do not place Fresnel Lens in the sun**. This may cause fire and heat related injuries.

WS-55815 / WS-65815

Lenticular Screen and Fresnel Lens Removal

1. Remove the screen assembly shown in the Cabinet Disassembly procedure.
2. Remove the Screen Frame top section by removing 4 screws (a).
3. Carefully grasp the Lenticular Screen and Fresnel Lens combination and pull upward and out of the Screen Frame Assembly.

Note: When separating the Lenticular Screen from the Fresnel Lens, use caution while prying the Screen and Lens apart. Use a slot type screw driver, and remove the pressure sensitive double sided tape.



Rear View

SERVICING THE LENTICULAR SCREEN AND FRESNEL LENS

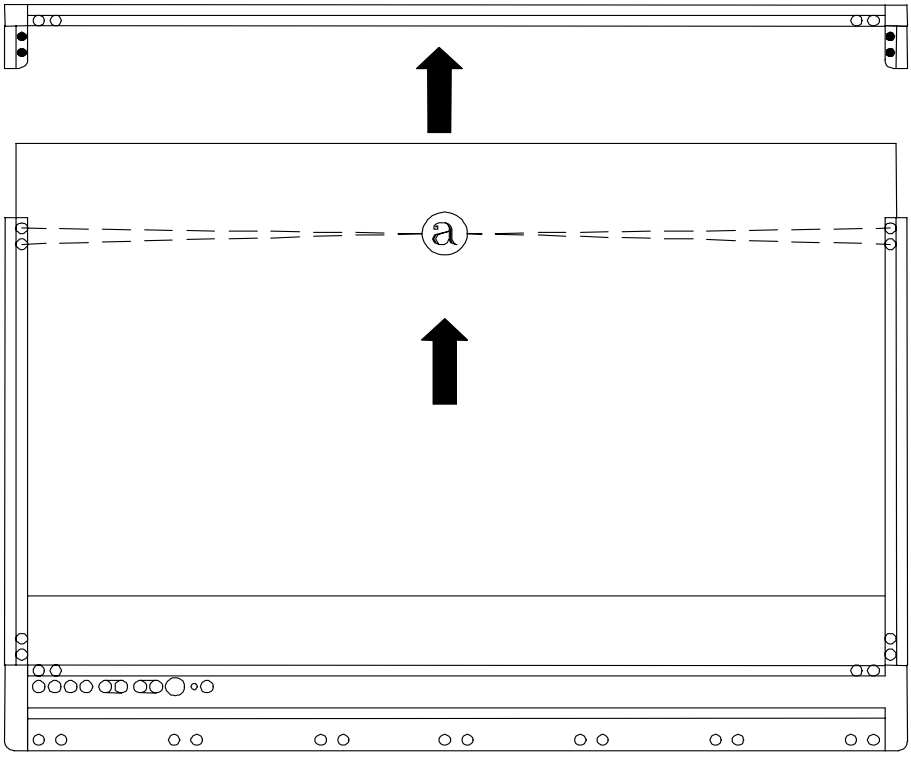
CAUTION: **Wear gloves** when handling the Lenticular Screen and Fresnel Lens. This prevents cuts and finger prints. **Do not place Fresnel Lens in the sun**. This may cause fire and heat related injuries.

WS-55615 / WS-65615 / WS-73615

Lenticular Screen and Fresnel Lens Removal

1. Remove the screen assembly shown in the Cabinet Disassembly procedure.
2. Remove the Screen Frame top section by removing 4 screws (a).
3. Carefully grasp the Lenticular Screen and Fresnel Lens combination and pull upward and out of the Screen Frame Assembly.

Note: When separating the Lenticular Screen from the Fresnel Lens, use caution while prying the Screen and Lens apart. Use a slot type screw driver, and remove the pressure sensitive double sided tape.



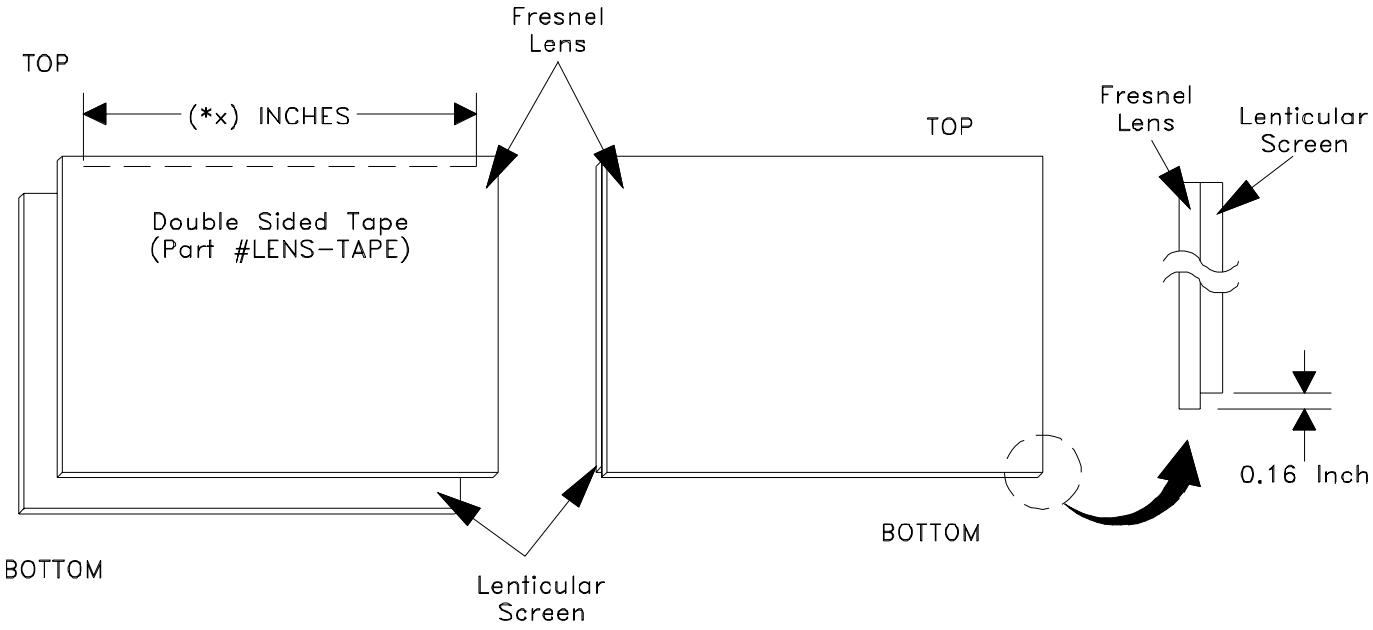
Rear View

SERVICING THE LENTICULAR SCREEN AND FRESNEL LENS

2. Lenticular Screen and Fresnel Lens Installation.

Note: Store the Lenticular Screen and Fresnel Lens in a cool dry place. High humidity may deform the Lenticular Screen and Fresnel Lens.

1. Apply double coated tape (Part # LENS-TAPE) along the top front edge of the Fresnel Lens as shown below. Refer to the Table below for proper tape length.
2. Place the Fresnel Lens on top of the Lenticular Screen and apply pressure at the top edge to bond them together as shown below.



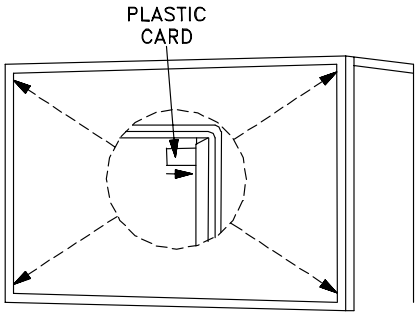
Model	Screen Size	Tape Length
WS-48515	48"	41.8"
WS-55515	55"	47.8"
WS-55615	"	"
WS-55815	"	"
WS-65515	65"	56.5"
WS-65615	"	"
WS-65815	"	"
WS-73615	73"	63.5"

SERVICING THE DIAMONDSHIELD™

1. DiamondShield™ Removal Procedure

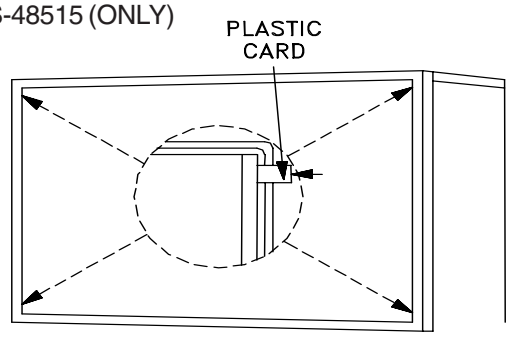
The appropriate disassembly procedure given below.

Note: ***Wear gloves when handling the DiamondShield™ to prevent finger prints.***



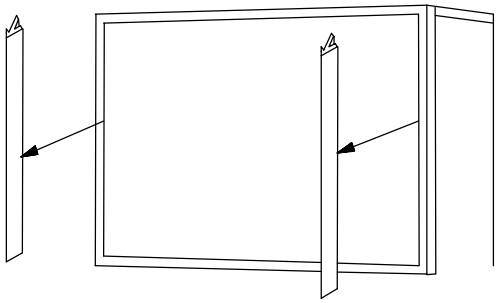
1. Gently insert a small plastic card (such as a credit card or a plastic putty knfe) between the DiamondShield™ and one end of the clip to pry the clip loose.

WS-48515 (ONLY)



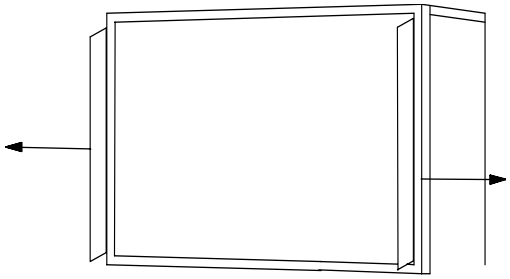
1. Gently insert a small plastic card (such as a credit card or a plastic putty knfe) between the notch of the bracket and one end of the clip to pry the clip loose.

WS-48515 / WS-55515 / WS-55815 / WS-65515 / WS-65815

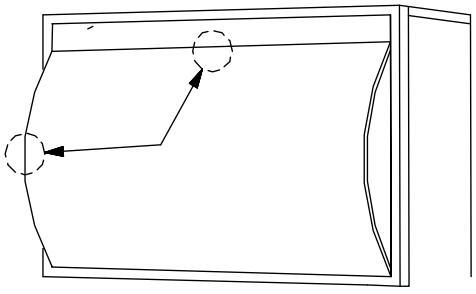


2. Remove both clips by pulling them toward you.

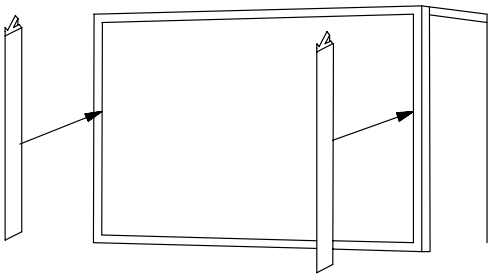
WS-55615 / WS-65615 / WS-73615



2. From edge of trim, pull bracket outward to open like a hinge.



3. Carefully insert the small plastic card (or plastic putty knife) into the gap at the side/center point of the Shield and pull the Shield slightly away from the unit. Place your hands at the points shown and gently bow the Shield toward you and remove from the unit.



4. Reinstall the two clips

2. DiamondShield™ Installation Procedure

*(See the Parts List for DiamondShield™ part numbers)

To install the DiamondShield™, reverse the above Removal Procedure.

CABINET SEPARATION

Mitsubishi 65 and 73 inch Projection TVs have been assembled in two pieces. These pieces may be separated for easier delivery and setup. The cabinet separation procedure requires two persons and varies between models.

WS-65815 Cabinet Separation Procedure

Figure 1

1. Remove the Speaker Grille by pulling forward.
2. Remove the two Front Cover screws (a).
3. To remove the Front Cover, slide to the right approximately 1", then pull away from the TV.

Figure 2

4. Remove Screw (b) from the front board.
5. Disconnect the LF connector.

Figure 3

6. Remove the plastic cover on each side.
7. Remove screw (c) on each side of the cabinet.

Figure 4

8. Slide the top of the cabinet top forward.

Figure 5

9. Carefully lift the cabinet top until the interlock tabs clear the cabinet bottom

Figure 6

10. Carefully place the cabinet top on the floor as shown.

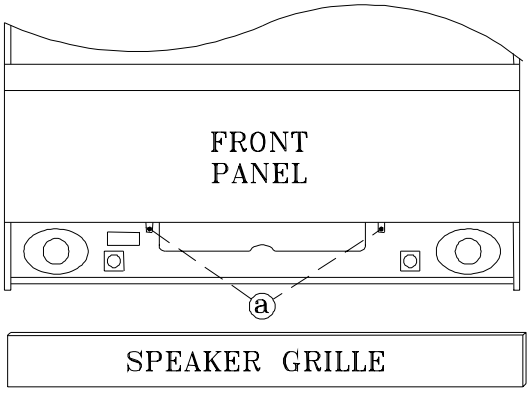


Figure 1

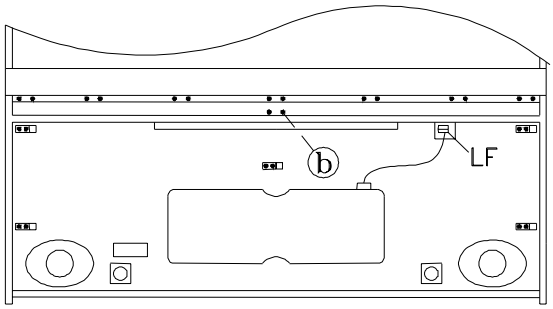


Figure 2

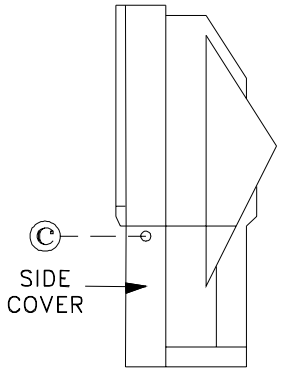


Figure 3

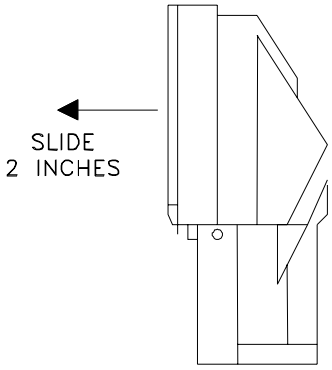


Figure 4

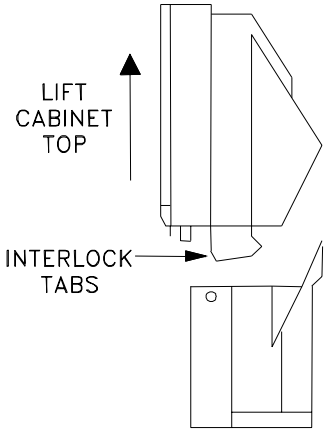


Figure 5

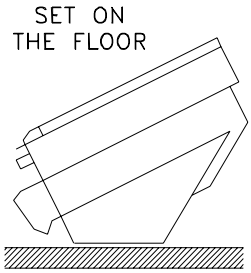
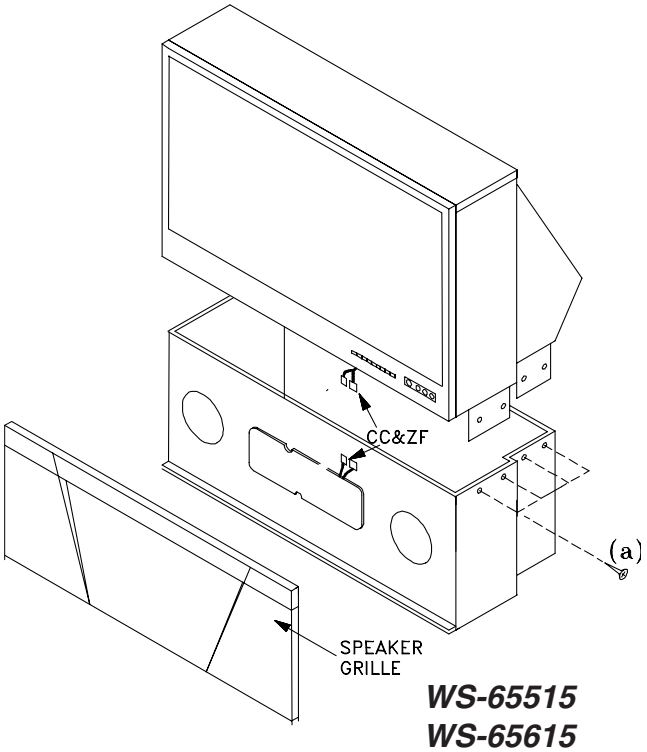


Figure 6

CABINET SEPARATION PROCEDURE
(WS-65515 / WS-65615 / WS-737615)

WS-65515 / WS-65615
Cabinet Separation Precedure

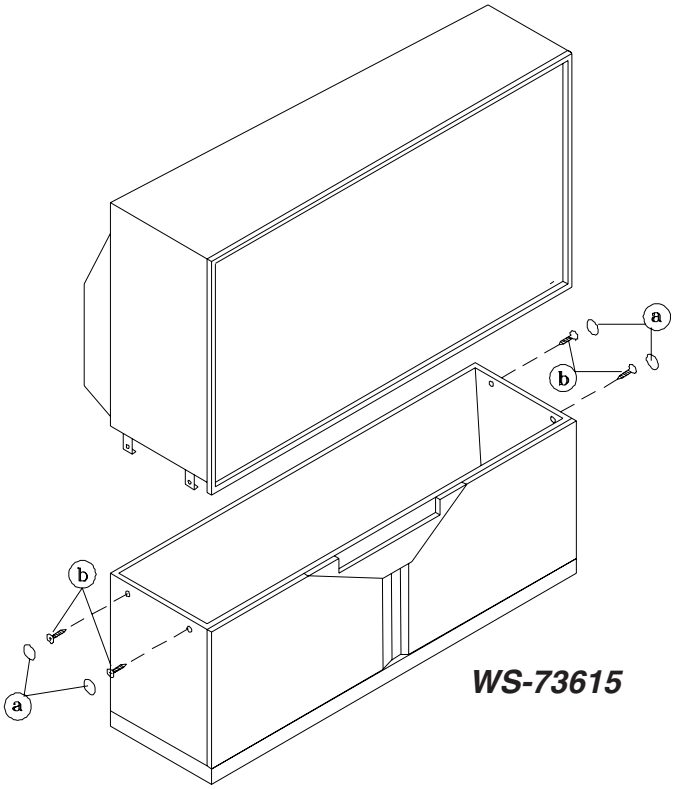
1. Pull the Speaker Grill from the cabinet.
2. Unplug the CC and ZF connectore
3. Remove 4 plastic covers and screws (a) from each side of the cabinet.
4. Carefully lift the cabinet top and place it on the floor.
5. Place the cabinet bottom in the desired location.
6. Reverse the procedure and mount the cabinet top on the cabinet bottom.



WS-65515
WS-65615

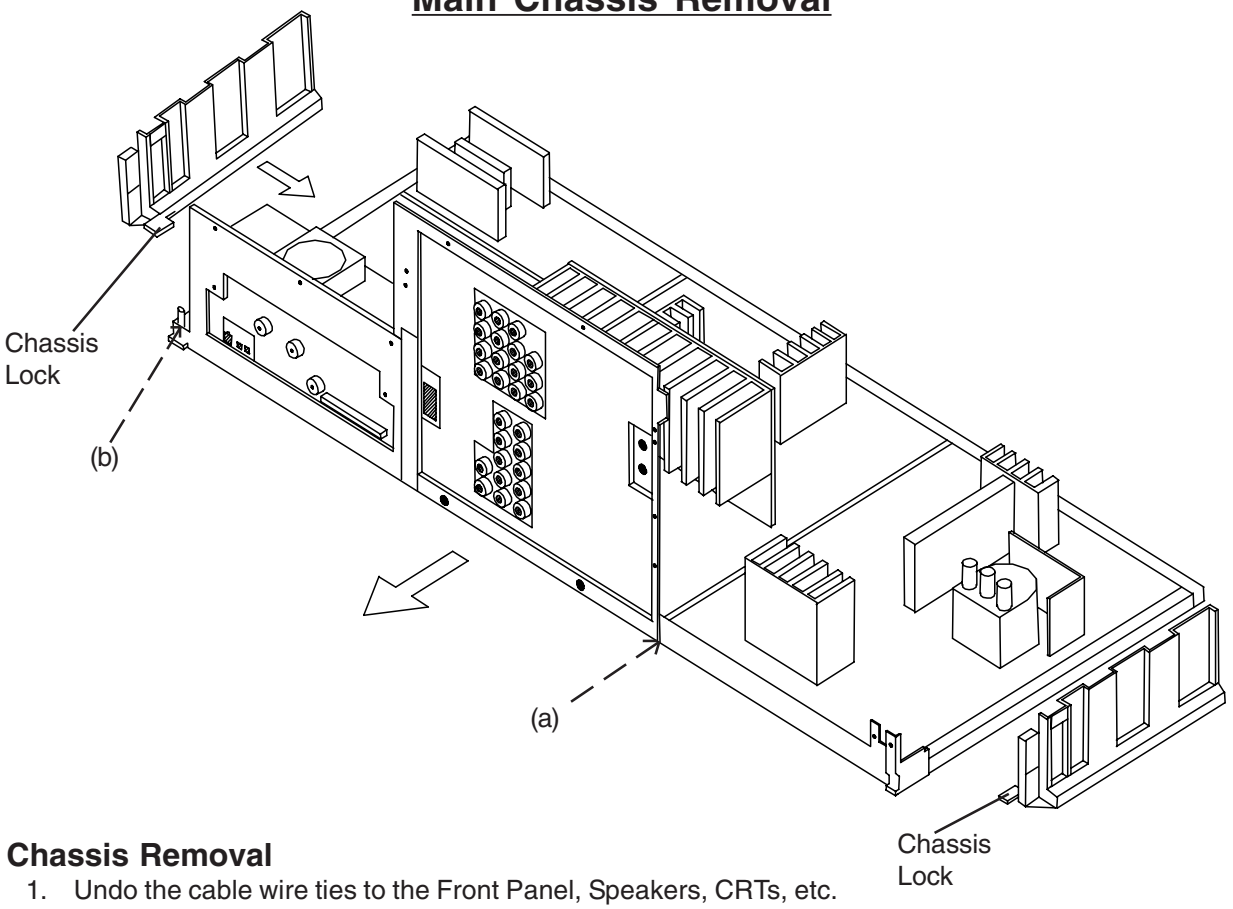
WS-73615
Cabinet Separation Precedure

1. Remove the 4 screw covers (a).
2. Remove 4 screws (b) securing the top and bottom cabinet sections .
3. Carefully lift the cabinet top and place it on the floor.
4. Place the cabinet bottom in the desired location.
5. Reverse the procedure and mount the cabinet top on the cabinet bottom.



WS-73615

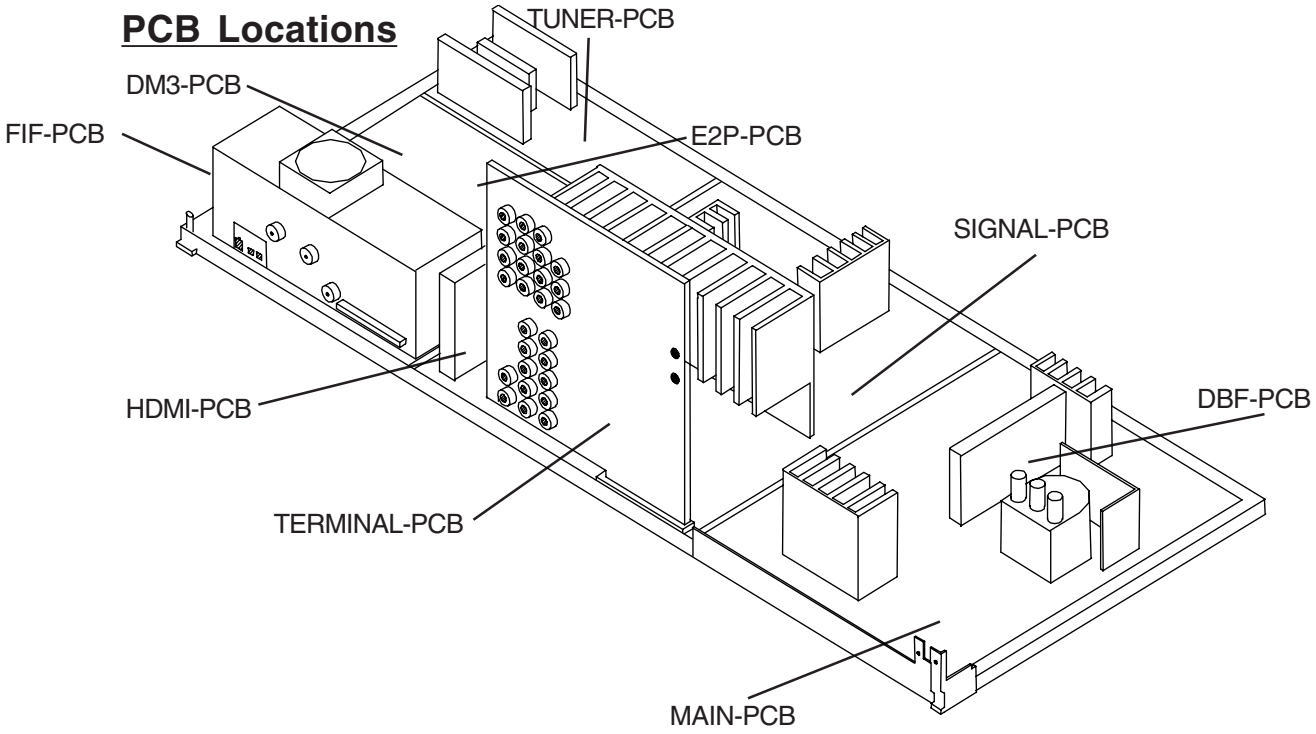
Main Chassis Removal



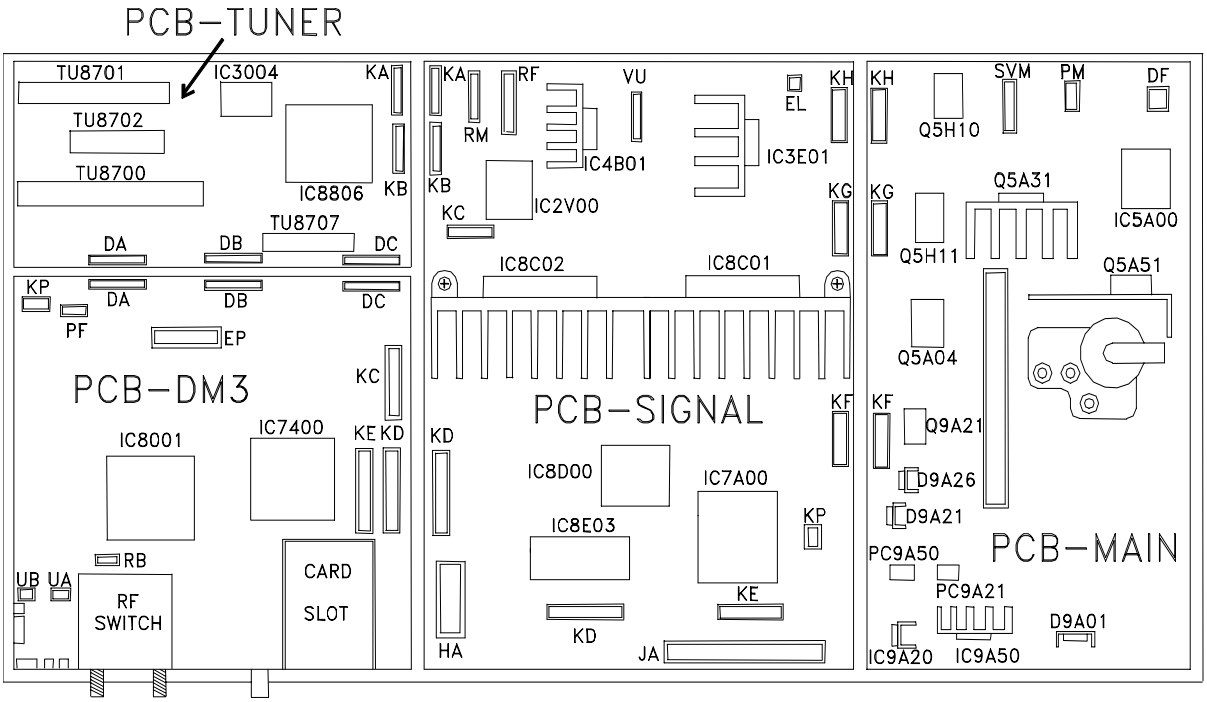
Chassis Removal

1. Undo the cable wire ties to the Front Panel, Speakers, CRTs, etc.
2. Unplug the Card Reader USB and 1394 cables from the DM PCB.
2. Remove screw (a) securing the Main Chassis and screws (b) in models WS-55815 and WS-65815 .
3. Release the Chassis Locks on each side of the chassis.
4. Slide the Chassis out the rear of the unit.
5. Tilt upward to access the bottom of the main chassis.

PCB Locations

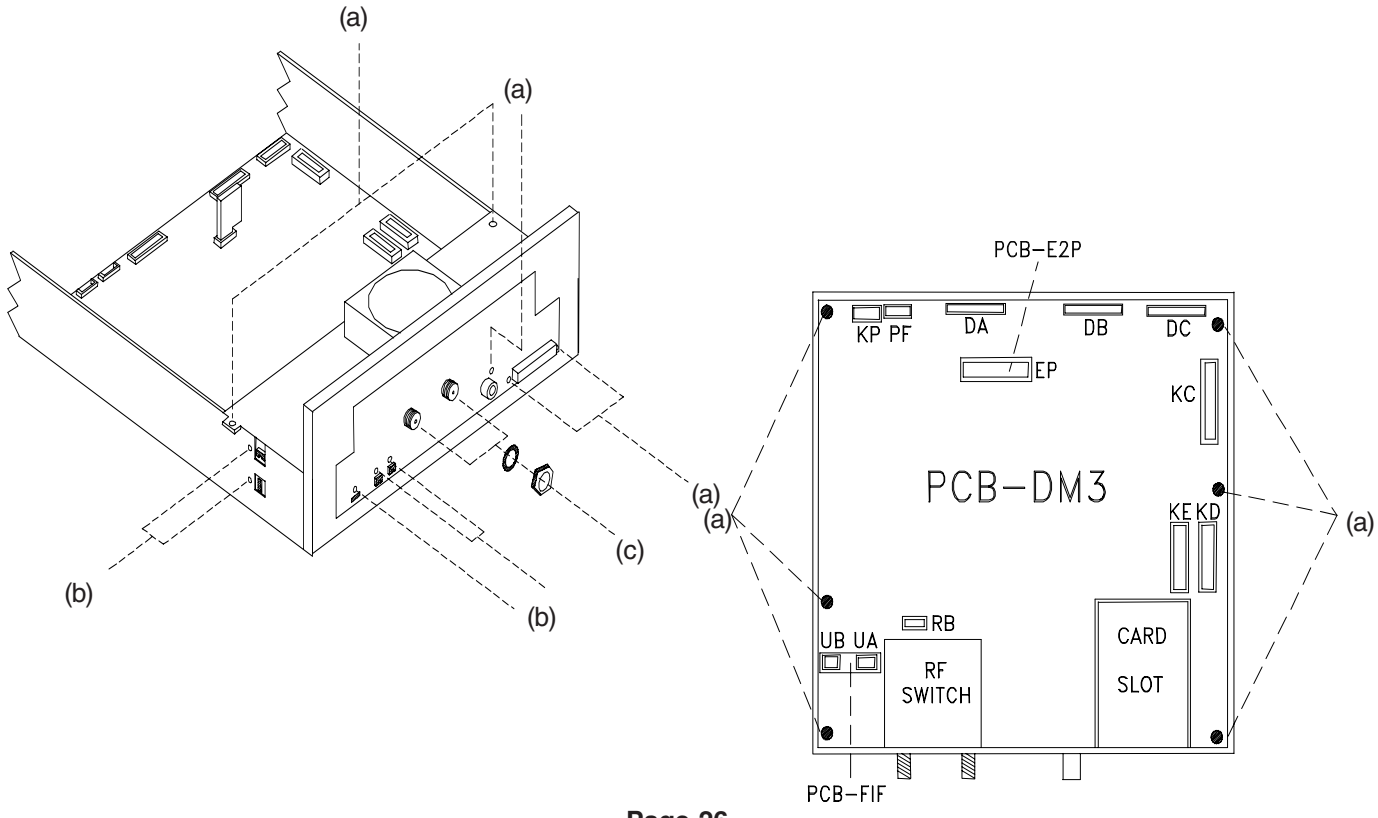


Main Components Location (Top View)



DM Module Replacement

1. Unplug the Card Reader USB and 1394 cables from the DM module, and refer to the Chassis Removal Procedure to slide the chassis towards the rear of the set.
2. Remove screws (a) and remove DM cover.
3. Remove screws (b) and nuts (c).
3. Remove the PCB-E2P from the original DM and plug it into the replacement DM.
4. Remove the PCB-FIF from the DM and install into the replacement DM (V25+ and V25++ only).
5. If CableCard™ is installed, remove.
5. Disconnect all wiring and connectors.
   NOTE: After replacement notify customer to contact cable company to reprogram CableCard™.



CRT REPLACEMENT

1. Removal of the CRT

Caution! High voltage should be completely discharged prior to CRT removal. Since The CRTs receive high voltage from the HV Block, discharge by shorting the open end of the respective high voltage cable to chassis ground.

Note: Refer to the Cabinet Disassembly Procedures when performing steps 1 through 4.

1. Remove the Speaker Grille, Front Board, and Screen Assy.
2. Remove the Back Board.
3. Remove the Anode Lead Wire from the CR Block.
4. Remove the PCB-CRT.
5. Remove 4 hex-screws "a" retaining the Optical Unit. [Figure 5-1]
6. Remove 4 screws "b" retaining the Lens.

Note: DO NOT loosen the RED screws. Doing so will break the seal between the C-Element and the # 6 Lens, causing leakage of the CRT Coolant.

7. Remove 4 screws "c" retaining the CRT. [Figure 5-2]
8. Remove the Deflection Yoke from the neck of the CRT. [Figure 5-7]

Figure 5-1

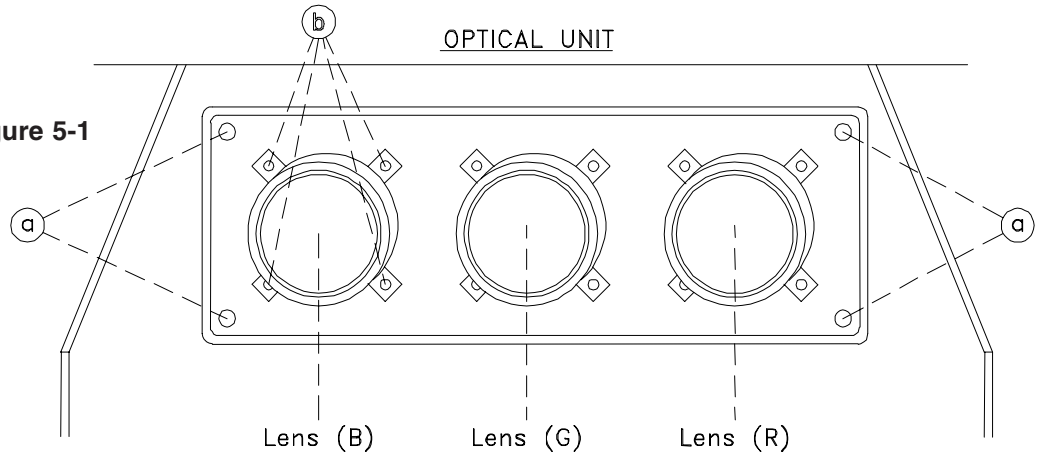
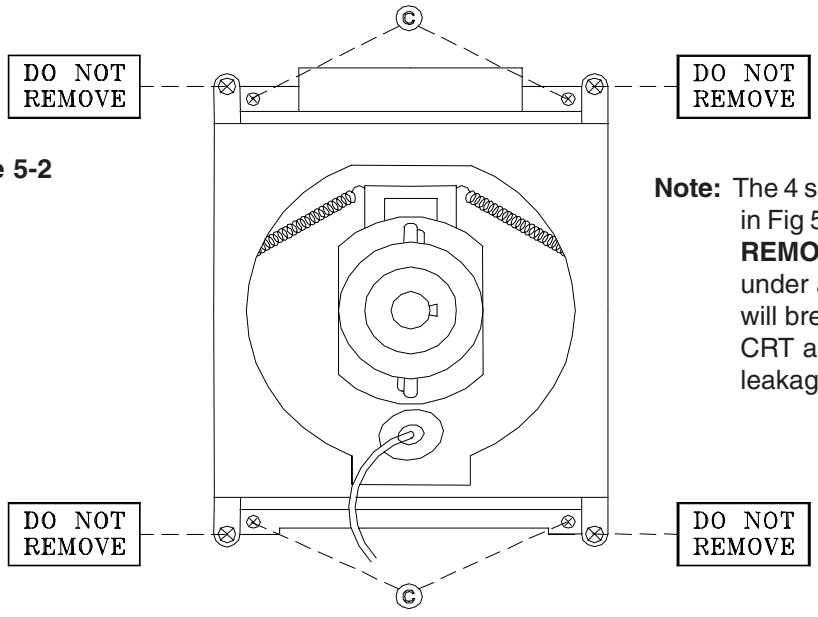


Figure 5-2



Note: The 4 spring-loaded screws shown in Fig 5-2 and labeled as "**DO NOT REMOVE**", should not be loosened under any circumstance. Doing so will break the seal between the CRT and the CRT-Spacer, causing leakage of the CRT Coolant.

2. Installation of the CRT

Note: The replacement CRT is supplied as an assembly comprised of the CRT and the Inner Lens with the space between them filled with ethylene glycol. Care should be taken during handling and installation to prevent shock from disrupting the seal or alignment between the CRT and Inner Lens. [Figure 5-3]

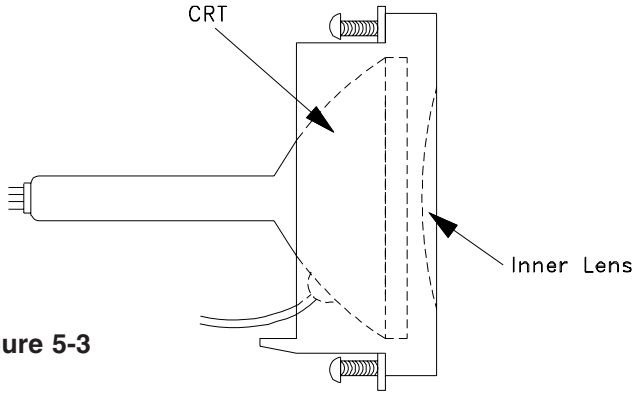


Figure 5-3

Note: The CRT fixing screws should not be loosened nor should they be removed. [Figure 5-4]

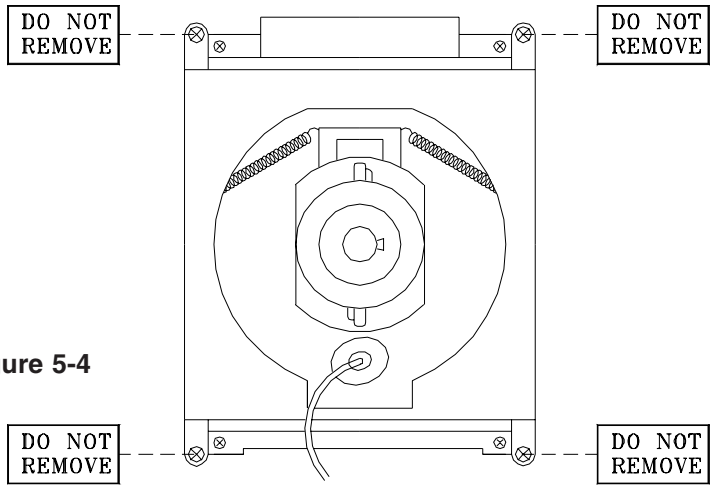


Figure 5-4

1. Carefully position the replacement CRT and fasten in place using 4 screws "d". [Figure 5-6]

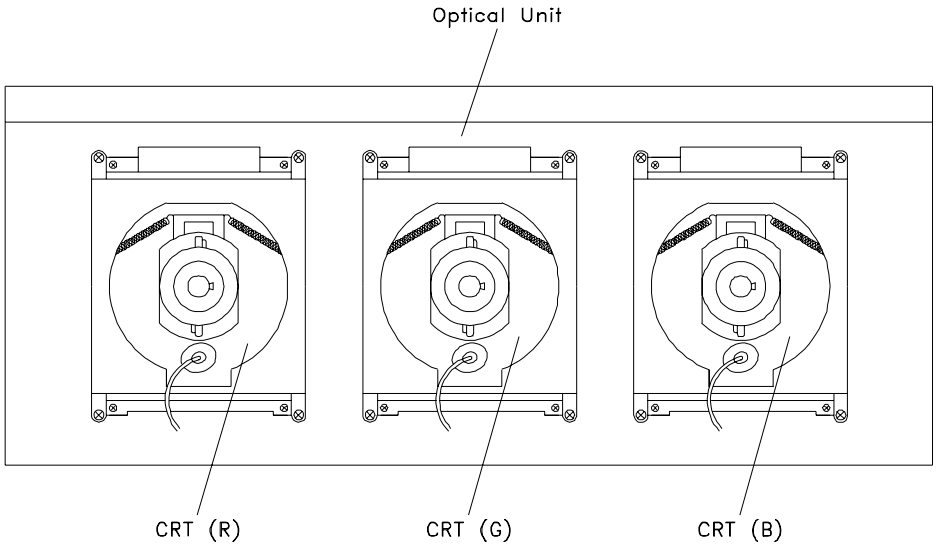


Figure 5-5

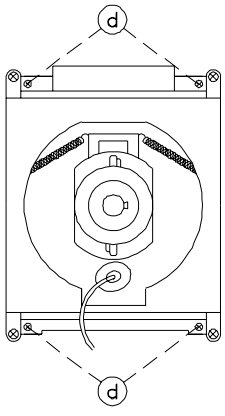


Figure 5-6

2. Install the Deflection Yoke on the CRT neck. [Figure 5-7]
3. Install the Lens that was removed in step 6 of Removal Of The CRT. [Figures 5-1 and 5-2]
    a) Position the Lens so that the Label faces the direction shown in Figure 5-8.
    b) Install the mounting screws. [Figure 5-1]
4. Connect the PCB-CRT.
5. Insert the Optical Unit into the Light Box Assembly.
6. Insert the Anode Lead Wire into the Flyback Transformer.
7. Re-clamp the Lead Wire in its original position.

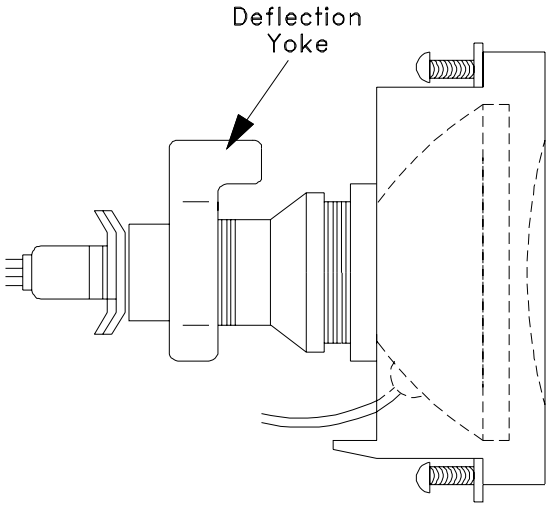


Figure 5-7

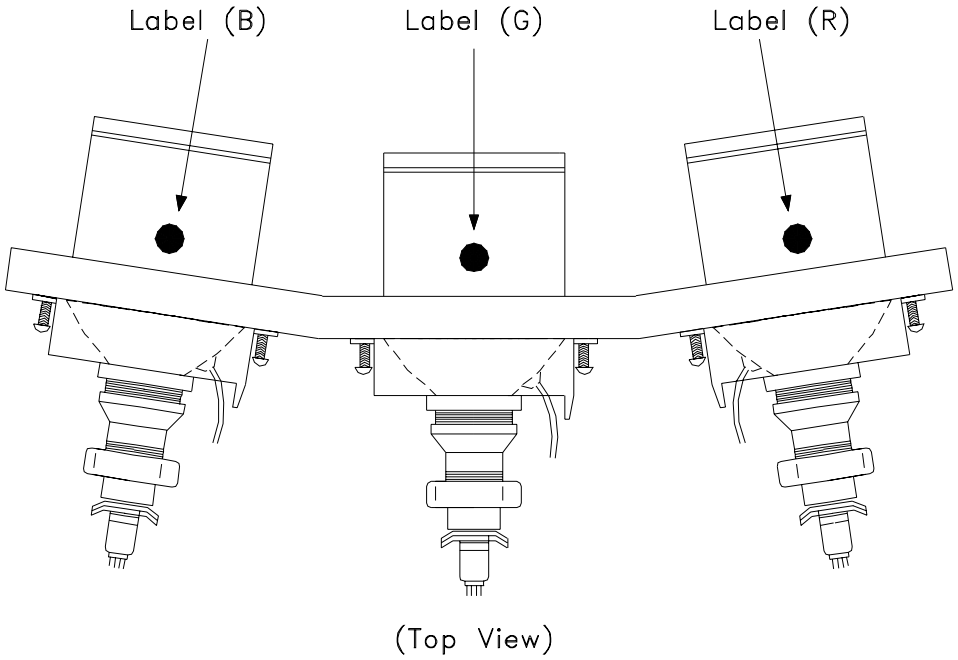


Figure 5-8

Adjustment procedures after replacing the CRT(s)

- CRT Cut Off / White Balance Adjustment
- Static Convergence Adjustment
- Dynamic Convergence Adjustment

ELECTRICAL ADJUSTMENTS

Note: Perform only the adjustments required.
Do not attempt an alignment if proper equipment is not available.

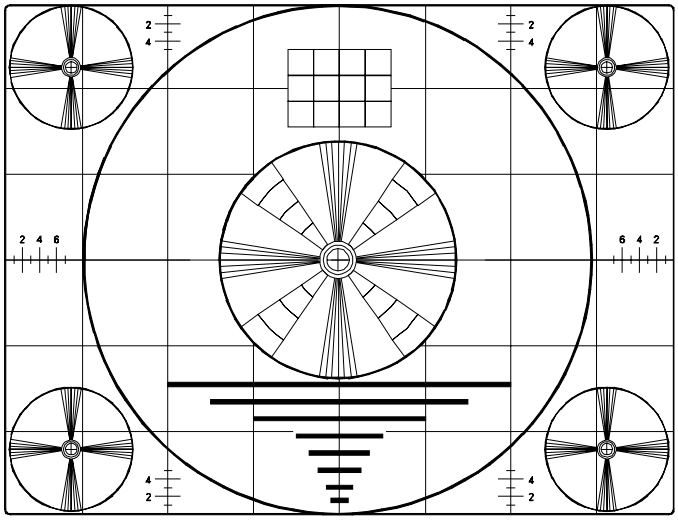
Test Equipment

- Oscilloscope (Unless otherwise specified, use 10:1 probes)
- Signal Generator (both SD and HD capable)
- Frequency Counter
- Direct Current Voltmeter
- Direct Current Power Supply
- Multiplex Audio Signal Generator
- Direct Current Ampere Meter

Test Signal

A. Monoscope Signal

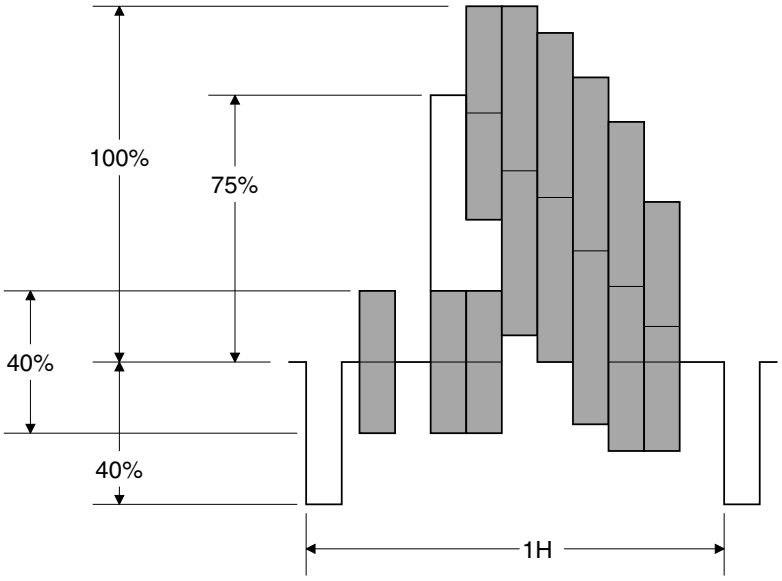
Note: If you do not have a monoscope signal source, connect the unit to a VCR and play a Monoscope *alignment tape.
(* Part Number: 859C568060)



Monoscope Signal

B. Color Bar Signal

Use the color bar signal shown below, unless otherwise specified in this manual.



Split-Field Color Bars (100% window)

Initial Setup

A. Option Menu Setup

Follow the steps below for the initial set-up:

1. Select the "MENU" display by pressing the "MENU" button once.
2. Press the number buttons "2", "4", "7", "0" in sequence to select the "OPTION MENU" display.
3. Press the "ADJUST" button to select "INITIAL."
4. Press "ENTER."

NOTE: At this time channel 3 is automatically selected.

(MENU-2-4-7-0)

OPTION MENU	
Initial	
Power restore	:OFF
DTV Port	:Auto
Direct Key Mode	:OFF

B. Default Settings

MAIN MENU DEFAULT SETTINGS

SETUP	
Edit Setup	
Review	
Antenna 1	(✓) Enabled
Antenna 2	(✓) Enabled
Input 1	(✓) Enabled
Input 2	(✓) Enabled
Input 3	(✓) Enabled
Component 1	(✓) Enabled
Component 2	(✓) Enabled
HDMI	(✓) Enabled
Card 1 (V25++)	(✓) Enabled
Card 2 (V25++)	(✓) Enabled
Card 3 (V25++)	(✓) Enabled
Card 4 (V25++)	(✓) Enabled
Icon Position	As above
Ant-1, Ant-2, ComFlash Input-1, Input-2, Input-3, Comp-1, Comp-2, HDMI, Cards 1…4	
Transport Menu	On
Energy Mode	Standard
Language	English
Digital Record Device	PVR
Channel View	OFF
ANTENNA	
Antenna	ANT 1
Memorize Channels	Air
Channel	Ch-3
Memory	Deleted
Prefer Digital	---

TIME	
Clock Setting	Manual
Time	12:00 AM
Date	01/01/01
Daylight Saving	Applies
CAPTIONS	
Analog Captions	On if Mute
Background	Gray
Digital Captions	On if Mute
Digital Settings	
Appearance	Default
V-CHIP LOCK	
V-CHIP	Off
TV Rating	TV-PG
FV-Fantasy Violence	(✓) Enabled
D-Sexual Dialog	(✓) Enabled
L-Adult Language	(✓) Enabled
S-Sexual Situation	(✓) Enabled
V-Violence	(✓) Enabled
Program not Rated	(✓) Enabled
Movie Rating	PG
V-Chip Time	
Start Time	12:00 AM
Stop Time	12:00 AM
Lock By Time	
Lock by Time	Off
Lock Time	NA
Unlock Time	NA
Front Button Lock	Off
AUDIO/VIDEO SETTINGS	
A/V Memory Reset	Ant-1

Audio	
Volume	30%
Bass	50%
Treble	50%
Balance	50%
Surround	Off
Listen to	Stereo
Level Sound	On
TV Speakers	On
Audio 2 Out	Main
Video	
Contrast	100%
Brightness	50%
Sharpness	50%
Color	50%
Tint	50%
Color Temp.	High
Video Noise	Standard
Film Mode	On
VSM Sharpness	On
Video Mute	On
Black Enhancement	On
Advanced	
Color Balance	Manual
PerfectColor™	
A/V Memory for Ant-A	All Centered
PIP/POP	
Source	Ant 1 Ch 3
PIP Position	Lower Right
POP Position	Right Half
PIP/POP Format	Dble. Window
Format	Stretched

A/V RESET DEFAULT SETTINGS (By Input)

A/V Memory	Ant 1/2	INPUTS 1/2/3	Compon. 1/2	1394 (If connected)	HDMI	Card 1~4 (V25++ Only)
Contrast	Max.	Max.	Max.	Max.	Max.	Max.
Brightness	Center	Center	Center	Center	Center	Center
Sharpness	Center	Center	Center	Center	Center	Center
Color	Center	Center	Center	Center	Center	Center
Tint	Center	Center	Center	Center	Center	Center
Color Temp.	High	High	High	High	High	High
Video Noise	Standard	Standard	Standard	N/A	Standard	N/A
Image Type	On	On	On	N/A	On	N/A
Define Edge VSM	On	On	On	On	On	On
Bass	Center	Center	Center	Center	Center	Center
Treble	Center	Center	Center	Center	Center	Center
Balance	Center	Center	Center	Center	Center	Center
Surround	OFF	OFF	OFF	OFF	OFF	OFF
Listen To	Stereo	N/A	N/A	N/A	N/A	N/A
Level Sound	On	On	On	On	On	On

C. A/V Memory

Each of the external inputs has its' own Audio/Video Memory. A change in an A/V setting at a specific input is stored in memory for that specific input.

A/V Reset

1. The front panel AV Reset button initializes all A/V Memories.
2. The AV Reset in the user's menu initializes only the selected input's A/V Memory except for Balance and Listen to.

LED Indicator Diagnostics

The "Power ON LED" provides an indication of the sets operation, and the possible cause of a malfunction.

1. Initial Control Circuitry Check

Immediately after the TV is connected to an AC power source:

LED Indications	Conditions	Probable Cause
Off	After AC is applied	No Standby Power or TV µPC not running
Fast Blink for 70 sec.	After AC is applied	Normal - DM µPC is booting up.
Fast Blink (Doesn't stop)	After AC is applied	TV µPC is running, but DM failed to boot up
Slow Blink	Set is Off	Normal - Timer is set for Auto Turn On

2. Error Code Operational Check

Note: The TV must be in "Shut Down" and not heve been switched Off, to perform the Error Code Operational Check. When the TV is switched Off, the code automatically resets to "12" No Error.

Pressing the front panel "DEVICE" and "MENU" buttons at the same time, and holding for 5 seconds, activates the Error Code Mode. The LED flashes denoting a two digit Error Code, or indicating no problem has occured since the last Initalization.

Note: The front panel buttons must used, NOT those on the Remote Control.

- The number of flashes indicates the value of the MSD (tens digit) of the Error Code.
- The flashing then pauses for approximately 1/2 second.
- The LED then flashes indicating the value of the LSD (ones digit) of the Error Code.
- The Error Code is repeated a total of 5 times.

Example: If the Error Code is "23", the LED will flash two times, pause, and then flash three times.

3. Error Codes

The Error Code designations indicating malfunction, or no malfunction, are listed below:

Error Code	Probable Cause
12	No error detected
21	X-Ray Protect
22	Short Protect
23	Loss of Deflection
35	Fan Failure

Remote Control Operational Modes

There are two Remote Hand Unit Operational Modes, "Standard" and "NetCommand™". The Remote is initially in the "Standard" mode. The "NetCommand™" mode is used when controlling Home Theater devices using NetCommand™. To change the Remote Operational Mode:

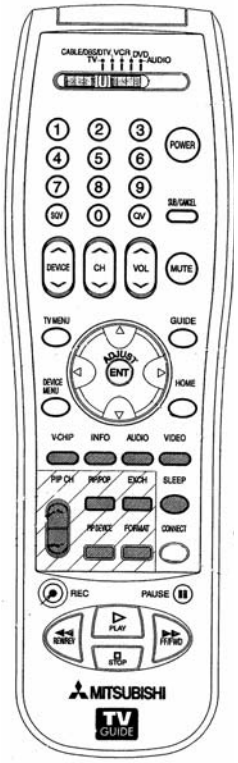
- Set the Remote to the TV Layer

- To change to "Netcommand™" ... Hold the "Power" button and press "9-3-5" in sequence.
- To change to "Standard" ... Hold the "Power" button and press "0-0-0" in sequence.

Circuit Adjustment Mode

Most of the adjustments can only be performed using the remote hand unit. Many of the adjustments must be performed in both the 480i and 1080i modes. Video/Color adjustments must be performed in the 480i and 1080i modes, and data must be preset in the 480P (DVD) mode.

Note: Set the Remote Operational Mode to "NetCommandTM". (Hold the "Power" button and press "9-3-5" in sequence.) This slows the remote's response and makes adjustments easier. When adjustments are complete, **set the Remote to its' original Operational Mode.** (Hold the "Power" button and press "0-0-0" in sequence)

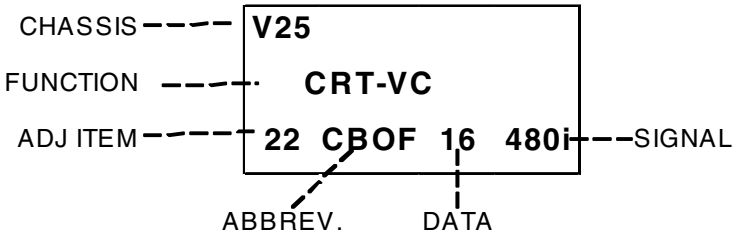


A. Activating the Circuit Adjustment Mode

The current signal source determines if the activated Adjustment Mode is 480i or 1080i.

1. Select the signal source (480i or 1080i).
2. Press the "MENU" button on a remote hand unit.
3. Press the number buttons "2", "4", "5", "7" in sequence. The screen will change to the Adjustment Mode.

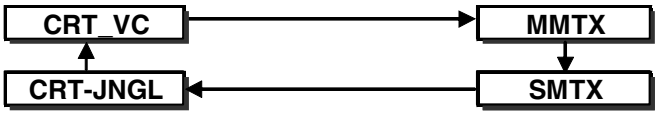
Note: Repeat steps 1 and 2 if the circuit adjustment mode does not appear on screen.



B. Selection of adjustment Functions and Adjustment Items

To select an adjustment item in the circuit adjustment mode, first select the adjustment function that includes the specific adjustment item to be selected. Then select the adjustment item. Refer to the following pages for the listing of adjustment functions and adjustment items.

1. Press the "AUDIO" button on a remote hand unit to select an adjustment function. Each time the button is pressed, the Function changes in the following sequence:



Adjustment Functions

2. Press the "VIDEO" button to select a specific Adjustment Item. The Item number increases each time the "VIDEO" button is pressed.

C. Changing Data

After selecting an adjustment Item, use the "ADJUST UP/DOWN" buttons to change data.

- Press "ADJUST DOWN" to decrease the data value.
- Press "ADJUST UP" to increase the data value.

D. Saving Adjustment Data

Press "ENTER" to save adjustment data in memory. The character display turns red for approximately one second in this step.

Note: If the circuit adjustment mode is terminated without pressing "ENTER", changes in adjustment data are not saved.

E. Terminating the Circuit Adjustment Mode

Press the "MENU" button on the remote hand unit twice to terminate the adjustment mode.

Note: The circuit adjustment mode can also be terminated by turning power OFF.

F. Toggle Between Reception Modes

Pressing **"3"** when in the Adjustment Mode CRT-VC Function toggles between 480i, 480p and 1080i. However data changes are not automatically saved. **Press "ENTER" to save data before pressing "3"**.

G. Service Mode Reset

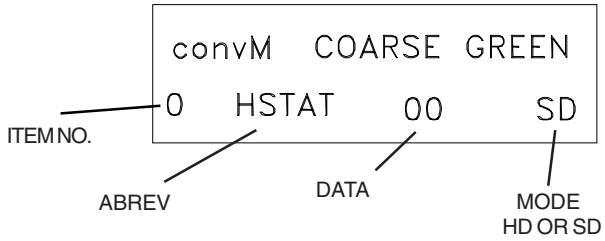
To reset items in the Service Mode to their factory values:

1. Press MENU-2-4-5-7 to enter the Service Mode.
2. Press the "0,1,2,3," insequence to Reset to the Factory settings.

On Screen Display Position Adjustment Mode

Activation

1. Select 480i or 1080i source.
2. Press MENU-2-4-8-8



Convergence Adjustment Mode

The Convergence mode is used to perform raster geometry correction, and convergence adjustments. These adjustments must be made in both the SD (NTSC) and HD modes.

Note: Before activating the Convergence mode, turn "Video Mute" Off. The internal crosshatch pattern will not be displayed with "Video Mute" On, only a blue background is displayed.

A. Convergence Mode Activation

1. Press MENU-2-4-5-9
2. When the Convergence Mode is activated, this display appears on a Green Crosshatch.

B. Selecting the HD or SD Mode

1. **Select the Signal Source** before entering the Convergence Mode, either an NTSC or HD source.

2. **Enter the Convergence Mode**
   - If the signal source is NTSC, the SD mode is activated.
   - If the signal source is HD, the HD mode is activated.

C. Convergence Mode Functions

In the Convergence Mode there are three main Functions (Categories).

- Pressing "6" activates CONV MISC
- Pressing "5" activates COARSE CONV
- Pressing "4" activates FINE CONV

D. CONVERGENCE MISC (Press 6)

This mode is used to preset data values controlling the Convergence Generator, and to perform the HV Regulation adjustment.

1. Use the VIDEO button to select an item.
2. Use the ADJUST buttons to change data.

NOTE: When Item "1 HVOL" is selected the screen goes black except for the data display. This occurs since a black screen is required when making the HV Regulation adjustment.

E. COARSE CONVERGENCE (Press 5)

There are four Sub Functions in the Coarse mode, COARSE GREEN, COARSE RED, COARSE BLUE and DF.

- COARSE GREEN .... used to make Coarse Raster Geometry Adjustments.
- COARSE RED ... used to make Coarse Red Convergence Adjustments.
- COARSE BLUE ... used to make Coarse Blue Convergence Adjustments.
- DF ... used to preset data values controlling the Dynamic Beam Focus circuit drive signal.

1. Use AUDIO button to select a Sub Function
2. Use the VIDEO button to select an Adjustment Item.
3. Use the ADJUST buttons to change data.

F. FINE CONVERGENCE (Press 4)

Sub Functions

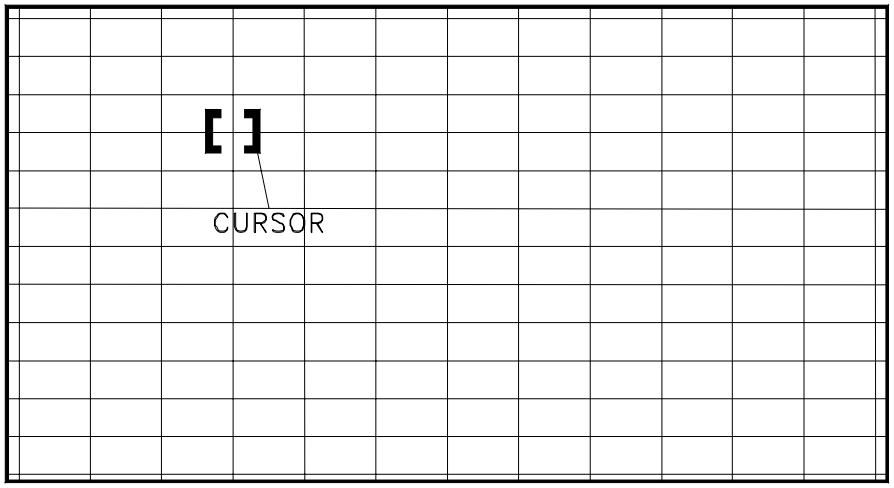
This mode is used to perform Fine Raster Correction, and Fine Red and Blue Convergence Adjustments. There are three Sub Adjustment Functions, selected with the AUDIO button:

- FINE GREEN .... a Green Crosshatch is displayed, to make Fine Raster Corrections.
- FINE RED .... a White Crosshatch is displayed, to make Fine Red Convergence Adjustments.
- FINE BLUE .... a White Crosshatch is displayed, to make Fine Blue Convergence Adjustments.

Cursor

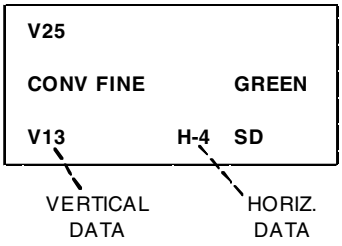
In the Fine mode a Cursor is added to the Crosshatch. The ENTER button toggles the Cursor between two modes:

- MOVE (blinking Cursor) .... use the ADJUST buttons to select any of 64 points on the Crosshatch.
- ADJUST (Non blinking Cursor) .... the ADJUST buttons adjust the active color at the current Cursor position, horizontally or vertically.



Display

The on-screen display changes in the Fine mode, as shown at the right. The display shows the vertical and horizontal data for the current Cursor Position, and the horizontal and vertical coordinates for that position.



G. Saving Data and Exiting the Convergence Mode

Press MENU twice to exit the Convergence mode, data is automatically saved.

E2PROM Replacement

Data accessed in the Convergence Adjustment Mode is stored in IC8D01on the PCB-SIGNAL and on the PCB-E2P. Replacement PCB's are supplied pre-aligned by model size so that only fine adjustments should be necessary after replacement. Other service data is stored on the PCB-E2P located on the DM assembly. When replacing the DM assembly, retaining the original PCB-E2P will eliminate the need for any realignment. The following tables are provided as a guide in case of total data loss.

List of Adjustment Items.

CRT-VC (Video Color)

IC2V00

Function Display		Adjustment Description	Data Range	Initial Data			Notes
				480i		480p / 1080i	
NO.	Abbrev.			ANT/INPUT	Component		
1	SBRT	Sub Brightness Adjust	0~63	20		20 / 20	Black Level
2	SCT	Picture Gain Adjust	0~63	31		42 / 42	Sub Contrast
3	SCON	Sub Contrast Adjust	0~15	7		7 / 7	Preset
4	RDRH	R-Drive (high)	0~15	31		31 / 31	White Balance
5	GDRH	G-Drive (high)	0~15	37		41 / 41	"
6	BDRH	B-Drive (high)	0~63	31		31 / 31	White Balance
7	CTRH	R-Cutoff (high)	0~63	31		31 / 31	"
8	CTGH	G-Cutoff (high)	0~63	25		31 / 31	"
9	CTBH	B-Cutoff (high)	0~63	31		31 / 31	"
10	RDRL	R-Drive (low)	0~63	31		31 / 31	"
11	GDRL	G-Drive (low)	0~63	37		41 / 41	"
12	BDRL	B-Drive (low)	0~63	31		31 / 31	"
13	CTRL	R-Cutoff (low)	0~63	31		31 / 31	"
14	CTGL	G-Cutoff (low)	0~63	25		31 / 31	"
15	CTBL	B-Cutoff (low)	0~63	31		31 / 31	"
16	GMMA	RGB Gamma correction	0~3	2		2 / 2	"
17	GAML	Gamma Differ. Sw.	0~1	0		0 / 0	Preset
18	BRT	Brightness Control	0~63	28	32	33 / 36	User
19	COL	Color Control	0~63	34	34	35 / 32	User
20	TNT	Hue Control	0~63	26	29	30 / 29	User
22	CBOF	Cb sub signal DC cancel	0~63	31		31 / 31	Preset
23	CR0F	Cr sub signal DC cancel	0~63	31		31 / 31	"
38	DCTR	Y DC trans. Ration	0~3	1		1 / 2	"
56	ASBL	S-ABL gain setting	0~3	0		0 / 0	"

CRT-JNGL Function (Jungle)

Display		Adjustment Description	Data Range	WS-48515		WS-55515		WS-55815 WS-55615		WS-65515 WS-65615		WS-73615		WS-65815	
No.	Item			SD	HD	SD	HD	SD	HD	SD	HD	SD	HD	SD	HD
1	HWID	Horizontal Width	0~63	32	31	29	30	21	21	26	26	28	28	25	25
2	HKEY	Horizontal Keystone	0~63	24	25	24	25	24	25	24	25	24	25	24	25
7	VHGT	Vertical Height	0~63	27	30	25	21	21	25	33	38	38	41	28	31
8	VLIN	Vertical Linearity	0~15	6	6	4	4	6	6	6	6	6	6	6	6
9	VSCN	Vertical S-Correction	0~15	0	0	0	0	0	0	0	0	0	0	0	0
13	H-POS	Horizontal Position	0~63	23	24	23	24	23	24	23	24	23	24	23	24
36	PINA	Pin Distortion	0~63	3	3	10	8	3	3	3	3	3	3	3	3

CONV GREEN Items

(MENU-2-4-5-9-5)

No.	Abbrev. Name	Description	WS-48515		WS-55515		WS-55615 WS-55815		WS-65515 WS-65615		WS-65815		WS-73615	
			SD	HD	SD	HD	SD	HD	SD	HD	SD	HD	SD	HD
1	HSTA*	Horizontal Position	0	0	0	0	0	0	0	0	0	0	0	0
2	VSTA*	Vertical Position	0	0	0	0	0	0	0	0	0	0	0	0
3	SKEW	Skew (Y axis rotation)	0	0	0	0	0	0	0	0	0	0	0	0
4	TILT	Tilt (X axis rotation)	0	0	0	0	0	0	0	0	0	0	0	0
5	HWID	Horisontal Width	20	20	20	20	20	20	20	20	20	20	20	20
6	HLIN	Horizontal Linearity	12	12	0	0	12	12	12	12	12	12	12	12
7	SPCC	Side Pin Cushion Correction	0	0	0	0	0	0	0	0	0	0	0	0
8	HKEY	Horizontal Keystone	0	0	10	10	0	0	0	0	0	0	0	0
9	TBPC	Top/Bottom PC Correction	-180	-150	-110	-110	-195	-180	-200	-170	-210	-180	-210	-180
10	VKEY	Vertical Keystone	0	0	15	10	0	0	0	0	0	0	0	0
11	VWID	Vertical Height	0	0	0	0	0	0	0	0	0	0	0	0
12	VLIN	Vertical Linearity.	0	0	0	0	0	0	0	0	0	0	0	0

***HSTA and VSTA must not exceed ±200**

CONV RED Items

(MENU-2-4-5-9-5)

No.	Abbrev. Name	Description	WS-48515		WS-55515		WS-55615 WS-55815		WS-65515 WS-65615		WS-65815		WS-73615	
			SD	HD	SD	HD	SD	HD	SD	HD	SD	HD	SD	HD
1	HSTA	Horizontal Position	50	50	50	50	50	50	50	50	100	100	10	100
2	VSTA	Vertical Position	0	0	0	0	0	0	0	0	0	0	0	0
3	SKEW	Skew (Y axis rotation)	0	0	0	0	0	0	0	0	0	0	0	0
4	TILT	Tilt (X axix rotation)	0	0	0	0	0	0	0	0	0	0	0	0
5	HLIN	Horixontal Linearity	-210	-190	-165	-165	-210	-150	-180	-160	-230	-210	-230	-210
6	HWID	Horizontal Width	0	0	0	0	10	10	0	0	0	0	0	0
7	VKEY	Vertical Keystone Correction	-140	-120	-85	-85	-100	-100	-100	-90	-170	-140	-140	-110
8	VWID	Vertical Height	0	0	0	0	0	0	0	0	0	0	0	0
9	VLIN	Vertical Linearity	0	0	0	0	0	0	0	0	0	0	0	0
10	TPPC	Top/Bottom PC Correction	20	20	30	30	20	20	20	20	20	20	20	20
11	SDBW	Horizontal Side Bow	30	30	20	30	30	30	30	30	30	30	30	30

***HSTA and VSTA must not exceed ±200**

CONV BLUE Items

(MENU-2-4-5-9-5)

No.	Abbrev. Name	Description	WS-48515		WS-55515		WS-55615 WS-55815		WS-65515 WS-65615		WS-65815		WS-73615	
			SD	HD	SD	HD	SD	HD	SD	HD	SD	HD	SD	HD
1	HSTA	Horizontal Position	-50	-50	-50	-50	-50	-50	-50	-50	-100	-100	-100	-100
2	VSTA	Vertical Position	0	0	0	0	0	0	0	0	0	0	0	0
3	SKEW	Skew (Y axis rotation)	0	0	0	0	0	0	0	0	0	0	0	0
4	TILT	Tilt (X axix rotation)	0	0	0	0	0	0	0	0	0	0	0	0
5	HLIN	Horixontal Linearity	210	190	165	165	180	180	180	160	250	220	230	200
6	HWID	Horizontal Width	0	0	-20	-20	0	0	0	0	0	0	0	0
7	VKEY	Vertical Keystone Correction	110	100	85	85	100	100	100	70	70	90	70	90
8	VWID	Vertical Height	0	0	0	0	0	0	0	0	0	0	0	0
9	VLIN	Vertical Linearity	0	0	0	0	0	0	0	0	0	0	0	0
10	TPPC	Top/Bottom PC Correction	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
11	HSBW	Horizontal Side Bow	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30

***HSTA and VSTA must not exceed ±200**

OSD Horizontal Centering (MENU-2-4-8-8)

Abbrev. Name	Description	Data
HR	Display horiz. Centering (NTSC)	120

DYNAMIC FOCUS (MENU-2-4-5-9-5)

Item Number	Abbrev. Name	Description	V25	V25+ V25++
1	DFH	Dynamic Focus Horizontal	-375	-450
2	DFV	Dynamic Focus Vertical	200	200

CONV MISC (MENU-2-4-5-9-6)

Item Number	Abbrev. Name	Data		Notes
		SD	HD	
1	HVOL	228	216	HV Adj.

* Do not change "1 HVOL" if it has been previously set.

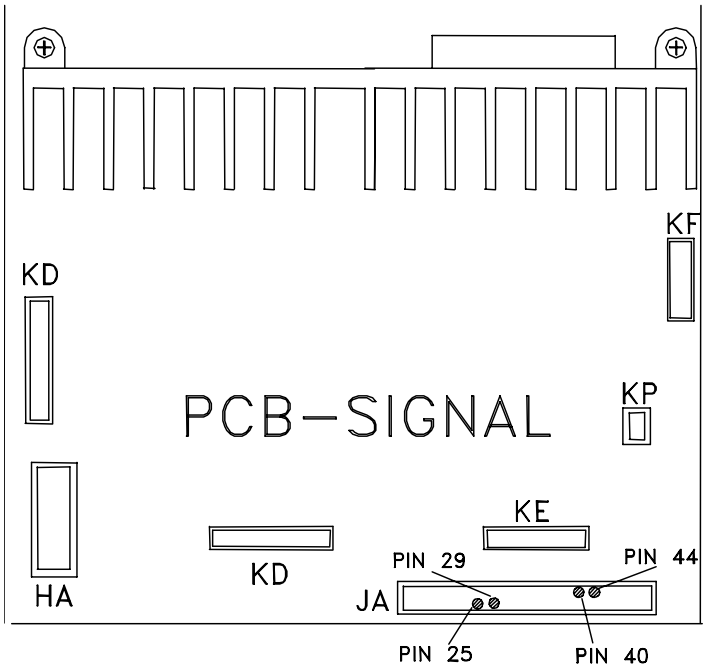
MAIN MATRIX (MENU-2-4-5-7)

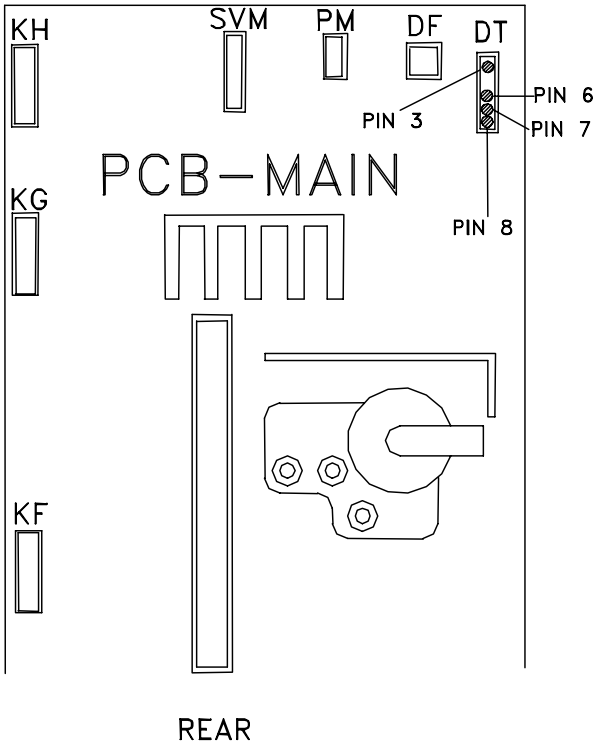
Item Number	Abbrev. Name	Description	Range	Initial
4	COLM	COLOR GAIN CONTROL	0-63	17
15	YDRM	Y DRIVE GAIN CONTROL	0-31	5

SUB MATRIX (MENU-2-4-5-7)

Item Number	Abbrev. Name	Description	Range	Initial
4	COLS	COLOR GAIN CONTROL	0-63	17
15	YDRS	Y DRIVE GAIN CONTROL	0-31	5

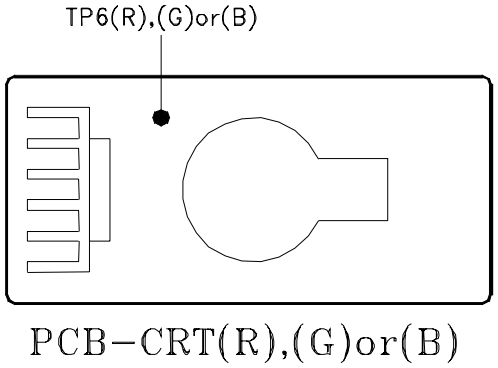
Adjustment Test Point Location





Test Points

DT pin 3 - HV Adjust
DT pin 6 - Ground
DT pin 7 - 12 Volts
DT pin 8 - ACL
JA pin 25- Main Picture (Y)
JA pin 29 - Main Picture (Cr)
JA pin 40 - Sub Picture (Y)
JA pin 44 - Sub Pictur (Cr)
TP6(R, G or B) - CRT Cathode



[HV Circuit]

1. HV Regulation

Purpose: To set the CRT Anode voltage.

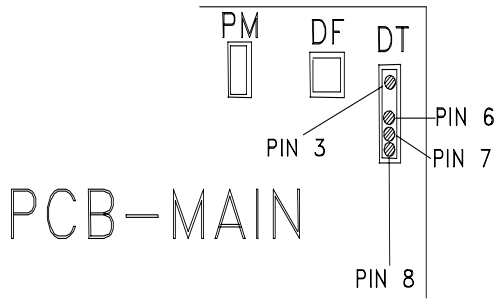
Symptom: Dark Picture

Measuring Instrument	DC Voltmeter
Test Point	DT connector pins 3 & 6
Ext. Trigger	------
Measuring Range	-------
Input Signal	Video Signal Monoscope
Input Terminal	Video Input

Note: *This adjustment must be rechecked following Adjustment 4 CRT Cutoff.*

1. Supply a video monoscope signal.
2. Set Contrast to maximum, and Brightness to mid position.
3. Connect a DC volt meter between **pins 3 and 6** of the **DT connector**. (Positive lead to pin 3)
4. Activate the Conv-Misc Mode.
5. Select Item "1 HVOL" (screen goes black).
6. Adjust Item "**1 HVOL**" for **15.4V ±0.2V** on the meter.
7. Save data and exit the Conv-Misc mode.
8. Confirm that the voltage does not change more than 0.15V.

Note: *This adjustment must be performed if E2RESET or Convergence E2RESET are activated.*



CONVERGENCE MODE

Activate ……..MENU-2-4-5-9
Misc. ……..……"6"
Color (R,G or B)……AUDIO
Item No……..……..VIDEO
Adjust/Move……..…ADJUST
Save Data……...…..ENTER
Exit……..……..MENU (twice)

[Video Circuit]

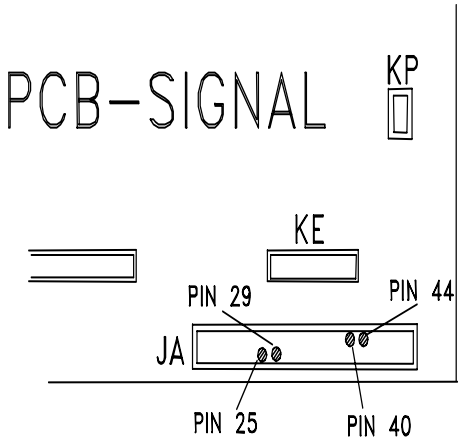
2. Main/Sub Y Level

Purpose To set picture luminance

Symptom: Excess or insufficient brightness.

Measuring Instrument	Oscilloscope
Test Point	JA connector pins 25 &40
Ext. Trigger	------
Measuring Range	------
Input Signal	Color Bars
Input Terminal	Video Input

1. Supply a color bar signal to a Video Input (not an RF input).
2. Select the color bar signal for both the main and sub pictures.
3. Connect the oscilloscope to connector **JA pin 25**.
4. Activate the Adjustment Mode
5. Select Item "**15 YDRM**" in the MAIN MTRX function.
6. Adjust the data for **0.66 Vp-p ~ 0.71 Vp-p**. (If it cannot be adjusted within this range, set to the lower value)
7. Move the oscilloscope to **JA pin 40**.
8. Select Item "**15 YDRS**" in the SUB MTRX function.
9. Adjust the data to equal the MAIN-Y Gain (**+0.0V -0.05V**).



CIRCUIT ADJUST MODE

Activate …….. MENU-2-4-5-7
Function ……..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..…ADJUST
Save Data …. ……..ENTER
Exit ……..MENU (twice)

[Video Circuit]

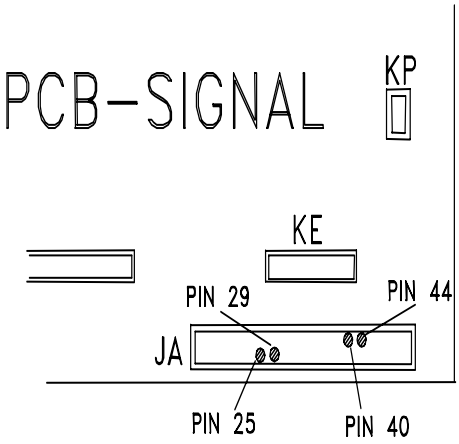
3. Main/Sub Color Level

Purpose: To match the sub picture color to that of the main picture.

Symptom: Main and sub pictures colors differ.

Measuring Instrument	Oscilloscope
Test Point	JA pin 29 & JA pin 44
Ext. Trigger	------
Measuring Range	------
Input Signal	Color Bars
Input Terminal	Video

1. Supply an NTSC signal to an External Video Input.
2. Select the NTSC signal as the source for both the main and sub pictures.
3. Connect an oscilloscope to connector **JA pin 29**.
4. Activate the Adjustment mode.
5. Select Item "**04 COLM**" in the Main Matrix Function.
6. Adjust data so the signal is **0.66 Vp-p ~ 0.71 Vp-p**.
   (If it cannot be adjusted within this range, set to the lower value)
7. Connect an oscilloscope to connector **JA pin 44**.
8. Select item "**04 COLS**" in the Sub Matrix Function.
9. Adjust so Sub = Main (**+0.0V - 0.05V**).



CIRCUIT ADJUST MODE

Activate …….. MENU-2-4-5-7
Function ……..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..…ADJUST
Save Data …. ……..ENTER
Exit ……..MENU (twice)

[CRT Circuit]

4. CRT Cutoff

Purpose To set the cutoff point for all three CRTs.

Symptom: Monochrome has a color tint, or incorrect brightness.

Measuring Instrument	Oscilloscope
Test Point	TP6R, TP6G, TP6B
Ext. Trigger	------
Measuring Range	50V/Div. 2msec/Div.
Input Signal	None
Input Terminal	Video Input

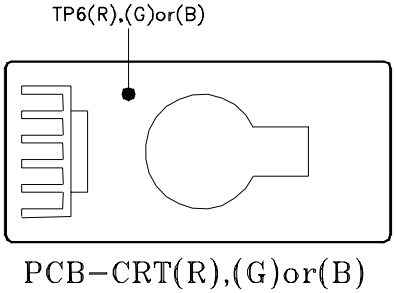
Note: ***Use the Expand mode (full screen)***

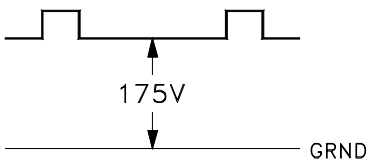
1. Select an External Input with no signal.
2. Enter the Adjustment Mode, VC Function.
3. Press "1", automatically blanks the screen and sets COL to 0.
   Note: If the screen goes blue, turn off Video Mute.
4. Set the data to the values given in the table below.
5. Connect the oscilloscope to **TP6R**.
6. Adjust the Red Screen VR so the black level is **175V**, as shown below, or 179V ±1VDC using an DC Voltmeter.
7. Repeat Steps 4 and 5 to set the Blue and Green Screen VRs, using **TP6G and TP6B**.

CRT Cutoff Presets
VC Function

Item	Abbr.	Setting
1	SBRT	20
2	SCT	31
3	SCON	7
4	RDRH	31
5	GDRH	37
6	BDRH	31
7	CTRH	31
8	CTGH	25
9	CTBH	31

Note: *White Balance must be performed after this adjustment.*





CIRCUIT ADJUST MODE

Activate …….. MENU-2-4-5-7
Function ……..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..…ADJUST
Save Data …. ……..ENTER
Exit ……..MENU (twice)

[CRT Circuit]

5. White Balance (NTSC)

Purpose: To set the CRTs white level in the NTSC mode.

Symptom: Monochrome has a color tint.

Measuring Instrument	
Test Point	------
Ext. Trigger	------
Measuring Range	------
Input Signal	NTSC White Raster
Input Terminal	RF or Video

Note: ***Use the "FORMAT" button to activate the Expand mode (full screen).***

1. Supply a full White Raster Signal
2. Activate the Service Mode, VC function.
3. Adjust Items "**4 RDRH**" and "**6 BDRH**" for optimum white at the center of the screen.
4. Reduce the input luminance level to **25%**.
5. Adjust Items "**7 CTRH**" and "**9 CTBH**" for optimum white.
6. Insert a Milliammeter in series with each CRT Cathode. The maximum allowable current for each CRT is given in the table below.
7. Set the white raster to **100%** and adjust Items "**10 RDRL**" and "**12 BDRL**" for optimum white at the center of the screen.
8. Reduce the luminance level to **25%**.
9. Adjust Item "**13 CTR**L" and "**15 CTBL**" for optimum white.
10. Set the data for Item "**19 COL**" **back to 31**.

CIRCUIT ADJUST MODE
Activate …….. MENU-2-4-5-7
Function ……..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..…..ADJUST
Save Data …. ……..ENTER
Exit ……..MENU (twice)

Maximum CRT Current

CRT	WS-48515 WS-55615 WS-65615 WS-55815 WS-55515 WS-65515	WS-65815 WS-73615
RED	580ua	900ua
GREEN	580ua	900ua
BLUE	580ua	900ua

[CRT Circuit]

6. White Balance (HD)

Purpose To set the CRTs white level in the HD mode.

Symptom: Monchrome pictures have a color tint.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	-----
Input Signal	HD White Raster
Input Terminal	Component

1. Supply an HD Full White Raster signal to the Component Inputs.
2. Select the Component Inputs (Input button)
3. Activate the Adjustment mode, VC Function.
4. Set Item **"19 COL" to 0**.
5. Adjust Items "**4 RDRH" and "6 BDRH**" for optimum white at the center of the screen.
6. Reduce the input signal luminance to **25%**.
7. Adjust Items "**7 CTRH" and "9 CTBH**" for optimum white.
8. Set the data for Item **"19 COL" back to original value**.

CIRCUIT ADJUST MODE
Activate …….. MENU-2-4-5-7
Function ……..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..…..ADJUST
Save Data …. ……..ENTER
Exit ……..MENU (twice)

[Video Circuit]

7. Black Level

Purpose: To set the black level of the picture.

Symptom: Excess or insufficient brightness.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	------
Input Signal	Monoscope
Input Terminal	Video Input

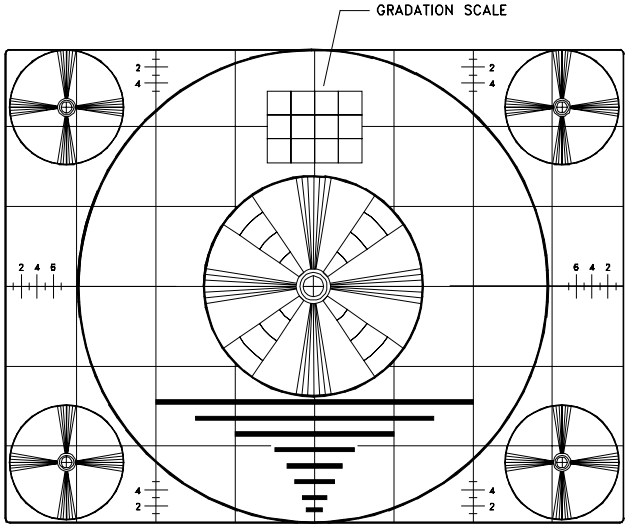
1. Supply a Monoscope signal to a Video Input.
2. Activate the Adjust Mode, VC Function.
3. Adjust Item "**1 SBRT**" so the 0% and 10% black levels on the gradation scale are the same.
4. Press ENTER to save data.
7. Exit the Service Mode.

CIRCUIT ADJUST MODE

Activate …….. MENU-2-4-5-7
Function ……..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..…ADJUST
Save Data …. ……..ENTER
Exit ……..MENU (twice)

40%	30%	20%	10%
50%	0%	0%	0%
60%	70%	80%	90%

GRADATION SCALE



[Video Circuit]

8. Sub Contrast

Purpose To set overall beam current to its' optimum level.

Symptom: Excess or insufficient contrast.

Measuring Instrument	DC ma meter
Test Point	DT connector pins 7 & 8
Ext. Trigger	------
Measuring Range	-----
Input Signal	Grayscale
Input Terminal	RF Input

Note: Activate the Stretch mode for this alignment.

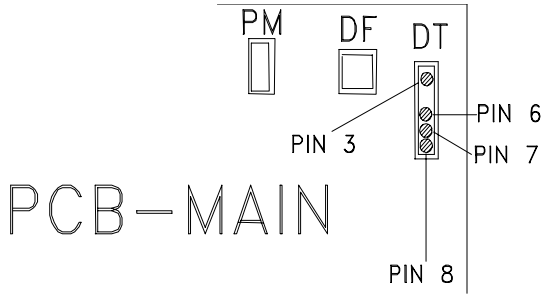
1. Supply a Grayscale signal to a RF Input.
2. Activate the Adjust Mode, CRT-VC Function.
3. Select Item "**2 SCT**", signal level automatically reduces.
4. Connect a 3ma DC meter between **DT connector pins 7 and 8**. Positive lead to pin 7.
5. Adjust Item "**2 SCT**" to the values given in the Table below.

MODEL	CURRENT
WS-65815 & WS-73615	525 ±5ua
All Other Models	480 ±5ua

6. Remove the meter.
7. Save data and Exit the Service Mode.

CIRCUIT ADJUST MODE

Activate …….. MENU-2-4-5-7
Function ……..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..…ADJUST
Save Data …. ……..ENTER
Exit ……..MENU (twice)



[Focus Circuit]

9. Dynamic Focus Preset

Purpose: To improve edge focus.

Symptom: Poor focus at the edges of the screen.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	-----
Input Signal	Monoscope
Input Terminal	Video Input

1. Supply a Monoscope signal to a Video Input
2. Activate the Convergence Mode.
3. Select the DF Function under the Conv. Coarse Mode.
4. Set Items **"1 DFH" and "2 DFV"** to the data values given in the DF Table.
5. Exit the Conv. Mode.

CONVERGENCE MODE

Activate ……..MENU-2-4-5-9
Misc. ……..…."6"
Coarse……..…."5"
Fine ……..…."4"
Color (R,G or B)……AUDIO
Item No……..…..VIDEO
Adjust/Move…….ADJUST
Cursor Toggle……..ENTER
Save & Exit…..MENU (twice)

DF
(MENU-2-4-5-9-5)

Item	Abbr.	Function	Data WS-48515 WS-55515	Data WS-55615 WS-55815 WS-65515 WS-65615 WS-65815 WS-73615
1	DFH	Dynamic Focus Horizontal	-375	-450
2	DFV	Dynamic Focus Vertical	200	200

[Video Circuit]

10. Lens Focus

Purpose To set the Lens position for optimum focus.

Symptom: Poor focus

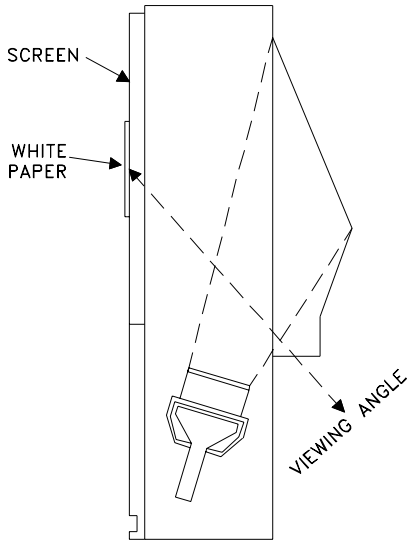
Measuring Instrument	-----
Test Point	------
Ext. Trigger	------
Measuring Range	-----
Input Signal	Monoscope
Input Terminal	Video Input

Note: *This adjustment must be done before Electrostatic Focus. Perform this adjustment for RED, GREEN, and BLUE monochrome pictures.*

1. Supply a VIDEO signal (Monoscope).
2. Cover the Red and Blue Lens (producing a green raster).
3. Adjust the Green Lens for best focus at the center of the Monoscope pattern.

Note: *Attach a white paper to the screen center. During adjustment, observe the picture on the screen from inside for easier adjustment.*

4. Repeat Steps 2 and 3 for the Red and Blue monochrome pictures.



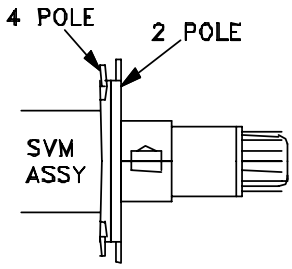
[CRT Circuit]

11. Electrostatic Focus & (Alignment Magnet)

Purpose: To set electrostatic focus to the optimum point.

Symptom: Poor focus.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	------
Input Signal	Monscope & Crosshatch
Input Terminal	Video Input



ALIGNMENT MAGNET

Note: *This adjustment must be performed after the Sub Contrast adjustment.*

Alignment Magnet Adjustment

This adjustment must be performed before Static Focus Adjustment

1. Supply a Crosshatch with Center Dot signal to a Video Input.
2. Set the display format to Standard (Format button)
3. Select a Green raster using the table below.
4. Roughly adjust Green Focus VR.
5. Rotate Green Focus VR CCW so the center dot is about 10mm diameter.
6. Adjust the Green 4 Pole Magnet for the roundest center dot.
7. Set the Green Focus VR for optimum focus.
8. Repeat the procedure with a Red raster and adjust the Red 4 Pole Magnet.
9. Use silicon to lock the magnets in place.

Static Focus Adjustment (All Models)

1. Supply a Monoscope signal to a Video Input
2. Activate A/V Reset
3. Select Red, Green or Blue rasters using the table below.
3. Set the Red, Green and Blue Focus VRs for optimum focus in the center of the picture.

Raster Color Selection

Color Raster	Activation Code
Red	MENU-2-4-5-9-1
Green	MENU-2-4-5-9-2
Blue	MENU-2-4-5-9-3

[On Screen Display]

12.Character Position

Purpose To position the character display horizontally.

Symptom: Incorrect display position

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	------
Input Signal	Video Signal (NTSC)
Input Terminal	ANT-1

1. Supply an NTSC signal to Ant-1 and select Ant-1 as the source.
2. Enter the OSD Position Mode, press "**MENU-2-4-8-8**".
3. Adjust "OSDSD" to center the OSD horizontally.
4. Press "MENU" to save data and exit the mode.

[Conv/Defl]

13. Geometry Preset

Purpose: To preset data controlling raster geometry

Symptom: Raster distortion.

Measuring Instrument	-----
Test Point	------
Ext. Trigger	------
Measuring Range	-----
Input Signal	NTSC & HD
Input Terminal	Video & Component Inputs

Procedure

In the Circuit Adjustment and Coarse Convergence Modes pre-set the data to the values given in the Tables below.

CRT-JNGL Function (Jungle)

Display		Data Range	WS-48515		WS-55515		WS-55815 WS-55615		WS-65515 WS-65615		WS-73615		WS-65815	
No.	Item		SD	HD	SD	HD	SD	HD	SD	HD	SD	HD	SD	HD
1	HWID	0~63	32	31	29	30	21	21	26	26	28	28	25	25
2	HKEY	0~63	24	25	24	25	24	25	24	25	24	25	24	25
7	VHGT	0~63	27	30	25	21	21	25	33	38	38	41	28	31
8	VLIN	0~15	6	6	4	4	6	6	6	6	6	6	6	6
9	VSCN	0~15	0	0	0	0	0	0	0	0	0	0	0	0
13	H-POS	0~63	23	24	23	24	23	24	23	24	23	24	23	24
36	PINA	0~63	3	3	10	8	3	3	3	3	3	3	3	3

CONV GREEN Items (MENU-2-4-5-9-5)

No.	Abbrev. Name	Description	WS-48515		WS-55515		WS-55615 WS-55815		WS-65515 WS-65615		WS-65815		WS-73615	
			SD	HD	SD	HD	SD	HD	SD	HD	SD	HD	SD	HD
1	HSTA*	Horizontal Position	0	0	0	0	0	0	0	0	0	0	0	0
2	VSTA*	Vertical Position	0	0	0	0	0	0	0	0	0	0	0	0
3	SKEW	Skew (Y axis rotation)	0	0	0	0	0	0	0	0	0	0	0	0
4	TILT	Tilt (X axis rotation)	0	0	0	0	0	0	0	0	0	0	0	0
5	HWID	Horisontal Width	20	20	20	20	20	20	20	20	20	20	20	20
6	HLIN	Horizontal Linearity	12	12	0	0	12	12	12	12	12	12	12	12
7	SPCC	Side Pin Cushion Correction	0	0	0	0	0	0	0	0	0	0	0	0
8	HKEY	Horizontal Keystone	0	0	10	10	0	0	0	0	0	0	0	0
9	TBPC	Top/Bottom PC Correction	-180	-150	-110	-110	-195	-180	-200	-170	-210	-180	-210	-180
10	VKEY	Vertical Keystone	0	0	15	10	0	0	0	0	0	0	0	0
11	VWID	Vertical Height	0	0	0	0	0	0	0	0	0	0	0	0
12	VLIN	Vertical Linearity.	0	0	0	0	0	0	0	0	0	0	0	0

CONV RED Items (MENU-2-4-5-9-5)

No.	Abbrev. Name	Description	WS-48515		WS-55515		WS-55615 WS-55815		WS-65515 WS-65615		WS-65815		WS-73615	
			SD	HD	SD	HD	SD	HD	SD	HD	SD	HD	SD	HD
1	HSTA	Horizontal Position	50	50	50	50	50	50	50	50	100	100	10	100
2	VSTA	Vertical Position	0	0	0	0	0	0	0	0	0	0	0	0
3	SKEW	Skew (Y axis rotation)	0	0	0	0	0	0	0	0	0	0	0	0
4	TILT	Tilt (X axix rotation)	0	0	0	0	0	0	0	0	0	0	0	0
5	HLIN	Horixontal Linearity	-210	-190	-165	-165	-210	-150	-180	-160	-230	-210	-230	-210
6	HWID	Horizontal Width	0	0	0	0	10	10	0	0	0	0	0	0
7	VKEY	Vertical Keystone Correction	-140	-120	-85	-85	-100	-100	-100	-90	-170	-140	-140	-110
8	VWID	Vertical Height	0	0	0	0	0	0	0	0	0	0	0	0
9	VLIN	Vertical Linearity	0	0	0	0	0	0	0	0	0	0	0	0
10	TPPC	Top/Bottom PC Correction	20	20	30	30	20	20	20	20	20	20	20	20
11	SDBW	Horizontal Side Bow	30	30	20	30	30	30	30	30	30	30	30	30

CONV BLUE Items (MENU-2-4-5-9-5)

No.	Abbrev. Name	Description	WS-48515		WS-55515		WS-55615 WS-55815		WS-65515 WS-65615		WS-65815		WS-73615	
			SD	HD	SD	HD	SD	HD	SD	HD	SD	HD	SD	HD
1	HSTA	Horizontal Position	-50	-50	-50	-50	-50	-50	-50	-50	-100	-100	-100	-100
2	VSTA	Vertical Position	0	0	0	0	0	0	0	0	0	0	0	0
3	SKEW	Skew (Y axis rotation)	0	0	0	0	0	0	0	0	0	0	0	0
4	TILT	Tilt (X axix rotation)	0	0	0	0	0	0	0	0	0	0	0	0
5	HLIN	Horixontal Linearity	210	190	165	165	180	180	180	160	250	220	230	200
6	HWID	Horizontal Width	0	0	-20	-20	0	0	0	0	0	0	0	0
7	VKEY	Vertical Keystone Correction	110	100	85	85	100	100	100	70	70	90	70	90
8	VWID	Vertical Height	0	0	0	0	0	0	0	0	0	0	0	0
9	VLIN	Vertical Linearity	0	0	0	0	0	0	0	0	0	0	0	0
10	TPPC	Top/Bottom PC Correction	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
11	HSBW	Horizontal Side Bow	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30

CIRCUIT ADJUST MODE

Activate …….. MENU-2-4-5-7
Function ……..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..…ADJUST
Save Data …. ……ENTER
Exit ……..…..MENU (twice)

CONVERGENCE MODE

Activate ……..MENU-2-4-5-9
Misc. ……..…….."6"
Coarse……..……."5"
Fine ……..……."4"
Color (R,G or B)……AUDIO
Item No……..…..VIDEO
Adjust/Move…….ADJUST
Cursor Toggle……..ENTER
Save & Exit…..MENU (twice)

[Deflection Circuit]

14: Deflection Geometry Height & Width Adjustment

Purpose: To set the height, width and linearity of the raster.

Symptom: Incorrect height, width and/or linearity.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	-----
Input Signal	Monoscope (NTSC & HD)
Input Terminal	Video & Component Inputs

Note:
Always use the *Standard Format* when aligning Geometry and Convergence.

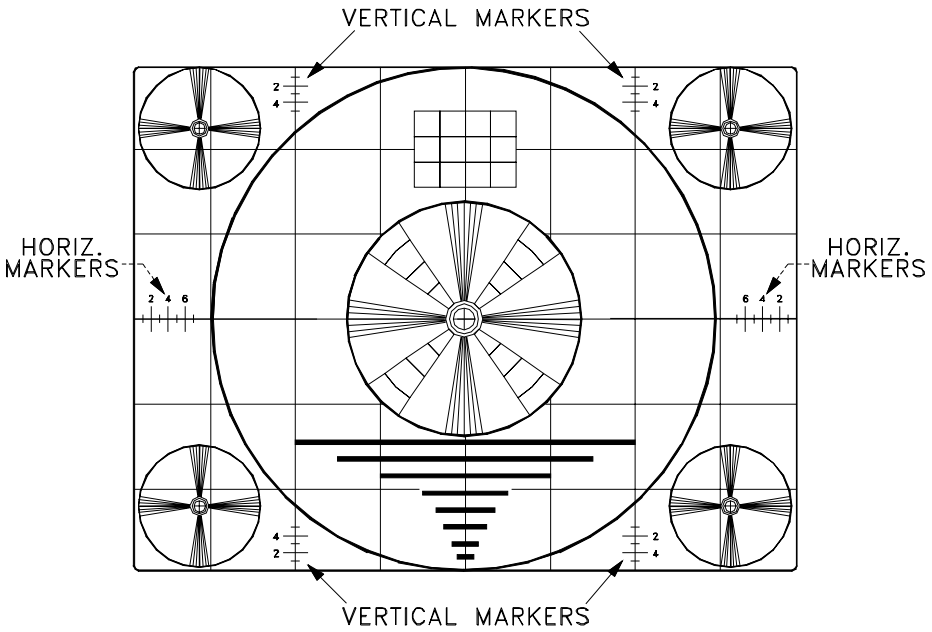
Preliminary:
1. DO NOT change the initial values for "#8 VLIN" in the CRT-JUNGLE Function.
2. DO NOT exceed the following VHGT adjustment ranges:
   NTSC ... from -4 to +10
   HD ... from -10 TO +5

NTSC Mode
1. Supply an NTSC Monoscope signal to a Video Input.
2. Select the Monoscope as the signal source.
3. Activate the Adjustment Mode, CRT-JNGL Function.
4. Select and adjust each of the following items.
   - "**7 VHGT**" ... so the vertical marker **sum = 4**
   - "**1 HWD**" ... so the horizontal marker **sum = 7**
5. Save data and Exit the Service Mode.

CIRCUIT ADJUST MODE

Activate …….. MENU-2-4-5-7
Function ……..……..AUDIO
Item No. ……..……VIDEO
Adjust Data ……..…..ADJUST
Save Data …. ……..ENTER
Exit ……..……..MENU (twice)

HD Mode
1. Supply an HD Monoscope signal to the Component HD Inputs.
2. Select the Component Inputs as the signal source (Input button)
3. Activate the Service Mode, CRT-JNGL Function.
4. Select and adjust each of the following items.
   - "**7 VHGT**" ... so the vertical marker **sum = 2**
   - "**1 HWD**" ... so the horizontal marker **sum = 5**
5. Save data and Exit the Service Mode.



[Convergence Circuit]

15. Convergence Geometry Adjustment

Purpose: To set the Convergence circuit geometry adjustments.

Symptom: Raster distortion at the top, bottom or sides of the picture.

Measuring Instrument	-----
Test Point	------
Ext. Trigger	------
Measuring Range	-----
Input Signal	NTSC -- None HD -- HD sync
Input Terminal	Video & Component Inputs

Note: *Deflection Circuit Geometry must be performed before this adjustment.*

Note:
Always use the *Standard Format* when aligning Geometry and Convergence.

NTSC mode

1. Select a Video Input with no signal.
2. Activate the Convergence Mode, Coarse Green.
3. Adjust the Coarse Green Items shown below for straight crosshatch lines.
4. Select the Fine Green Mode, a Cursor is displayed on the crosshatch.
5. Use the Cursor to adjust for straight crosshatch lines.
6. Exit the Convergence Mode.

HD mode

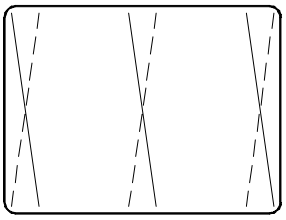
1. Supply horizontal and vertical HD sync to the Components Input and select the Component Inputs as the source.
3. Repeat NTSC Steps 3 through 6 from NSTC mode above in HD mode.

CONVERGENCE MODE

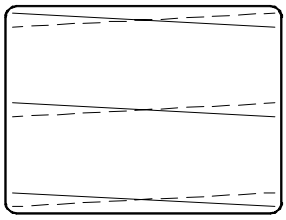
Activate ……..MENU-2-4-5-9
Misc. ……..…"6"
Coarse……..…."5"
Fine ……..."4"
Color (R,G or B)……AUDIO
Item No……..VIDEO
Adjust/Move…….ADJUST
Cursor Toggle……..ENTER
Save & Exit…..MENU (twice)

COARSE GREEN ADJUSTMENTS

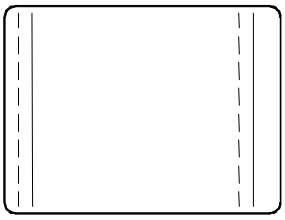
3 SKEW



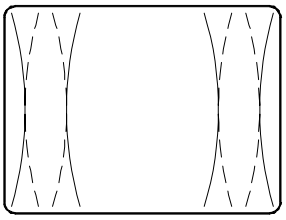
4 TILT



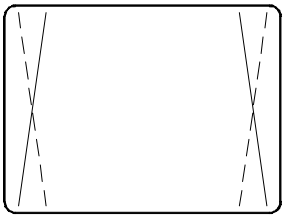
6 HLIN



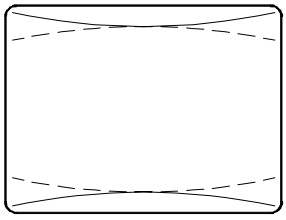
7 SPCC



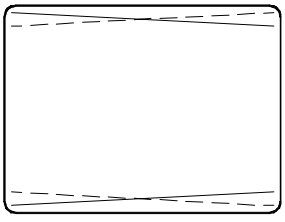
8 HKEY



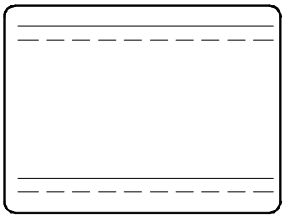
9 TBPC



10 VKEY



12 VLIN



[Convergence Circuit]

16. Centering and Static Convergence

Purpose: To converge red, green and blue at the center of the screen

Symptom: Color edging over the entire picture.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	-----
Input Signal	NTSC -- Monoscope HD -- Monoscope
Input Terminal	Video & Component Inputs

CONVERGENCE MODE

Activate ……..MENU-2-4-5-9
Misc. ……..…."6"
Coarse……..…."5"
Fine ……..."4"
Color (R,G or B)……AUDIO
Item No……..VIDEO
Adjust/Move…….ADJUST
Cursor Toggle……..ENTER
Save & Exit…..MENU (twice)

Preliminary

Degauss the shield cover and bracket unit of the CRT assembly and chassis.
DO NOT degauss the CPM Assemblies.

CAUTION: **Do Not** adjust the Alignment Magnets instead of the Centering Magnets.

NOTE: Confirm that Item #13 HPOS, in the CRT-JNGL function of the MENU-2-4-5-7 Adjustment mode is set to the following values:

HD=34
SD=23

HD mode (The following steps must be performed in the HD mode)

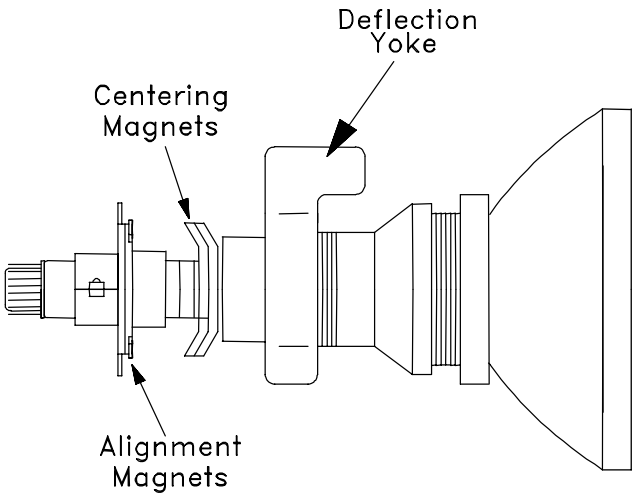
1. Supply an HD Monoscope signal to the Component Input.
2. Select the Component Input as the signal source (Input button).
3. Enter the Convergence Coarse mode.
4. Set the data for the "HSTA" and "VSTA" items to:

GREEN	RED	BLUE
HSTS = 0	HSTA = 50	HSTA = -50
VSTA = 0	VSTA = 0	VSTA = 0

5. In the Coarse Green mode:
   - Center the Green Raster using the Green Centering Magnet.
   - Rotate the Green Deflection Yoke to correct any tilt.
6. In the Coarse Red mode, use the Red Centering Magnet to converge red on the green at the center of screen. Correct any red tilt with the Red Deflection Yoke.
7. In the Coarse Blue mode, repeat Step 6 using the Blue Centering magnet and the Blue Deflection Yoke.
8. Exit the Convergence mode.

SD mode

1. Supply an NTSC Monoscope signal to a Video Input.
2. Select the Monoscope as the signal source (Input button).
3. Enter the Convergence Coarse Green mode.
4. Confirm that the Green Raster is centered.



[Convergence Circuit]

17. Coarse Convergence

Purpose: To converge red and blue on green at the edges of the screen.

Symptom: Color edging at the top, bottom and sides of the screen.

Measuring Instrument	-----
Test Point	------
Ext. Trigger	------
Measuring Range	-----
Input Signal	NTSC -- None HD -- HD sync
Input Terminal	Video & Component Input

CONVERGENCE MODE

Activate ……..MENU-2-4-5-9
Misc. ……..…."6"
Coarse……..…."5"
Fine ……..."4"
Color (R,G or B)……AUDIO
Item No……..VIDEO
Adjust/Move…….ADJUST
Cursor Toggle……..ENTER
Save & Exit…..MENU (twice)

Note:
Always use the *Standard Format* when aligning Geometry and Convergence.

SD mode

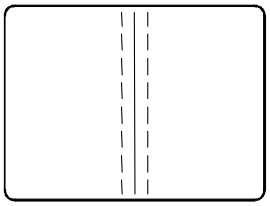
1. Select an External Input with no signal.
2. Activate the Convergence Mode, Coarse Red.
3. Adjust the Items shown below to converge the red on the green.
4. Select Coarse Blue mode.
5. Adjust the Items shown below to converge the blue on the green.
   Note: *If center convergence shifts, use red and blue Items "0 HSTA" and "1 VSTA" to correct the shift.*
6. Exit the Convergence Mode.

HD mode

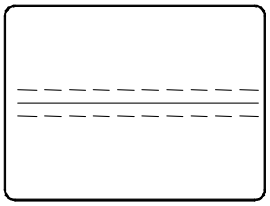
1. Supply horizontal and vertical HD sync to the Component Input and select the Component Input as the source.
2. Repeat SD Steps 2 through 5 in the From the SD mode in HD mode.
3. Exit the Convergence mode.

COARSE CONVERGENC RED & BLUE ADJUSTMENTS

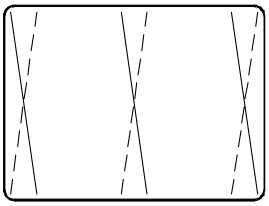
1 HSTA*



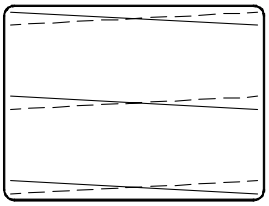
2 VSTA*



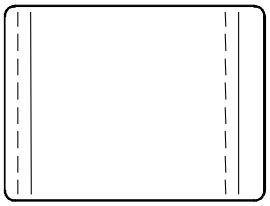
3 SKEW



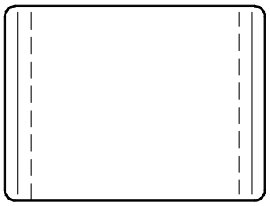
4 TILT



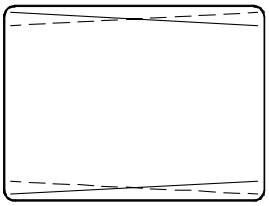
5 HLIN



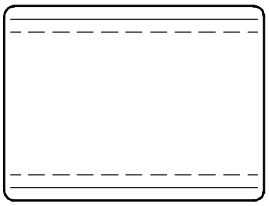
6 HWID



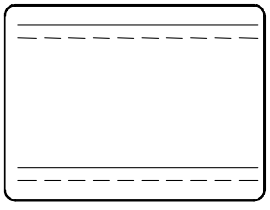
7 VKEY



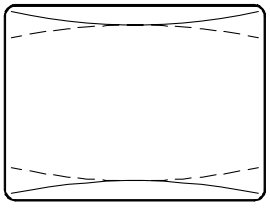
8 VWID



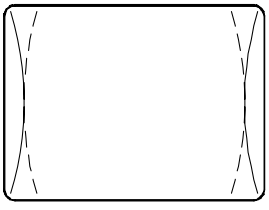
9 VLIN



10 TBPC



11 HSBW



*** Data should not exceed ±100**

[Convergence Circuit]

18. Fine Convergence

Purpose: To converge red, green and blue at the edges of the screen

Symptom: Color edging at the edges of the picture.

Measuring Instrument	-----
Test Point	-----
Ext. Trigger	------
Measuring Range	-----
Input Signal	NTSC -- None HD -- HD sync
Input Terminal	Video & Component Input

CONVERGENCE MODE

Activate ……..MENU-2-4-5-9
Misc. ……..…."6"
Coarse……..…."5"
Fine ……..."4"
Color (R,G or B)……AUDIO
Item No……..…..VIDEO
Adjust/Move…….ADJUST
Cursor Toggle……..ENTER
Save & Exit…..MENU (twice)

Note:
Always use the *Standard Format* when aligning Geometry and Convergence.

SD Fine Adjustment

1. Select an External Input, no signal.
2. Activate the Convergence Mode, Fine Red.
3. Use the Cursor to converge red on the green.
4. Select the Fine Blue mode.
5. Use the Cursor to converge blue on the green.
6. Exit the Convergence mode.

HD Fine Adjustment

1. Supply an HD signal (sync only) to the Component input and select Component Input as the input source.
2. Repeat SD Fine Adjustment Steps 2 through 6, in the HD mode.
3. Exit the Convergence mode.

CHIP PARTS REPLACEMENT

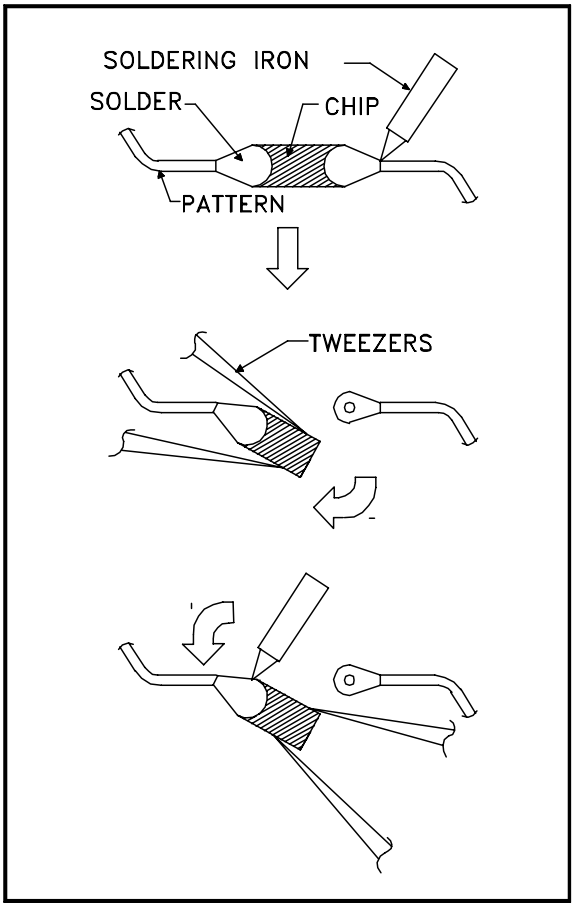
Some resistors, shorting jumpers (0 Ohm resistors), ceramic capacitors, transistors and diodes are chip parts. The following precautions should be taken when replacing these parts.

Cautions:

1. Use a fine tipped, well insulated soldering iron (approximately 30 watts), and tweezers.
2. Melt the solder and remove the chip parts carefully so as not to tear the copper foil from the printed circuit board.
3. Discard removed chips; do not reuse them.
4. Do not apply heat for more than 3 (three) seconds to new chip parts.
5. Avoid using a rubbing stroke when soldering.
6. Take care not to scratch, or damage the chip parts when soldering.
7. Supplementary cementing is not required.

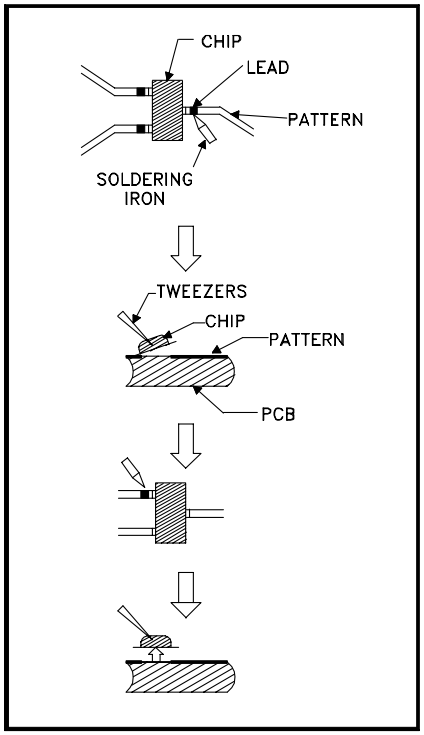
Chip Parts Removal (Resistors, Capacitors, etc.)

1. Grasp the part with tweezers. Melt the solder at both sides alternately, and remove one side of the part with a twisting motion.
2. Melt the solder at the other side and remove the part.



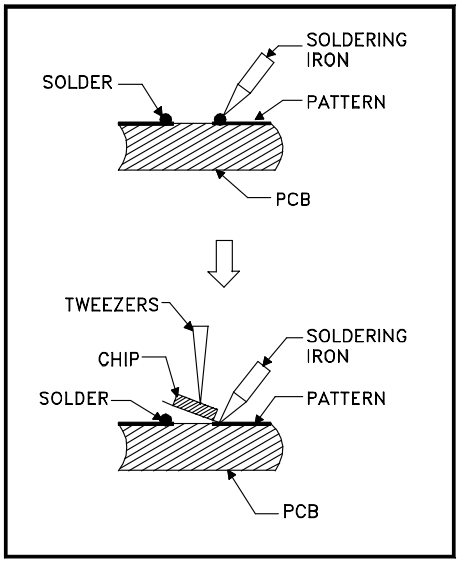
Chip Parts Removal (Transistors)

1. Melt the solder of one lead and lift the side of that lead upward.
2. Simultaneously melt the solder of the other two leads and lift the part from the PCB.



Replacement

1. Presolder the contact points on the circuit pattern.
2. Press the part downward with tweezers and apply the soldering iron as shown.



REPLACEMENT PARTS

Parts Ordering

To expedite delivery of replacement parts orders, specify the following:

1. Model Number/Serial Number
2. Part Number and description
3. Quantity

Note: Unless complete information is supplied, delay in processing of orders will result.

Critical and Warranty Parts Designation

Critical Electrical Components are indicated in the parts data base and by **Bold Type** in the Parts List.

Parts Tolerance Codes

Refer to the following chart for tolerance characteristics of electrical components.

MARK	B	C	D	F	G	J	K
Tolerance %	± 0.1	± 0.25	± 0.5	± 1	± 2	± 5	± 10

MARK	M	N	V	X	Z	P	Q
Tolerance %	± 20	± 30	± 10	+ 40 -20	+ 80 -20	+ 100 - 0	+ 30 -10

MARK	M	N	V	X	Z
Tolerance (pF)	± 0.1	± 0.25	± 0.5	± 1	± 2

QUICK REFERENCE FOR COMMON REPLACEMENT PARTS

CRT ASSEMBLIES

MODEL	ASSY-CRT-RED	ASSY-CRT-GREEN	ASSY-CRT-BLUE
WS-48515	251C227010	251C227020	251C227030
WS-55515	251C227040	251C227050	251C227060
WS-55615	251C228010	251C228020	251C228030
WS-55815	251C228040	251C228050	251C228060
WS-65515	251C228070	251C228080	251C228090
WS-65615	251C330010	251C330020	251C330030
WS-65815	251C227070	251C227080	251C227090
WS-73615	"	"	"

REMOTE CONTROL

290P122010	REMOTE-CONTROL - V25/V25+	WS-48515 / WS-55515 / WS-55615 WS-65515 / WS-65615 / WS-73615
290P123010	REMOTE-CONTROL - V25++	WS-55815 / WS-65815

HIGH VOLTAGE / DEFLECTION COMPONENTS

Q5A31	261P122010	HORIZ-OUT 2SC5778	
Q5A51	261P142010	HV-OUT 2SK2847	
T5A51	334P288010	TRANS-FLYBACK	
	129P070020	VR-FOCUS	
	338P054010	SVM COIL	WS-48515 / WS-55515 / WS-65515
	338P054020	SVM COIL	WS-55615 / WS-55815 / WS-65615 WS-65815 / WS-73615
	330P294010	DEFL-YOKE 840uH	WS-48515 / WS-55515
	330P294020	DEFL-YOKE 720uH	WS-55615 / WS-55815 / WS-65515 / WS-65615 WS-65815 / WS-73615
	453B036010	CAP-ANODE-LONG-RED	WS-48515 / WS-55515 / WS-55615 / WS-55815 WS-65515 / WS-65615
	453B036020	CAP ANODE-LONG-G&B	" " " " " "
	453B036070	CAP-ANODE-SHORT-RED	WS-65815 / WS-73615
	453B036080	CAP ANODE-LONG-G&B	" " "

MISCELLANEOUS

MODEL	MIRROR	LENTICULAR SCREEN	FRESNEL LENS
WS-48515	767D072040	491P138030	491P139020
WS-55515	767D072050	491P180010	491P181010
WS-55615	767D072030	"	"
WS-55815	767D072060	"	"
WS-65515	767D048090	491P182010	491P183010
WS-65615	"	"	"
WS-65815	"	491P182020	491P183020
WS-73615	767C031020	491P185010	491P186010

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
		TUBES	
	251C227010	**ASSY-CRT-R(P16LZA00RFA)**	**a**
	251C227020	**ASSY-CRT-GR(P16LZA00HHA)**	**a**
	251C227030	**ASSY-CRT-BL(P16LZA00BMB)**	**a**
	251C227040	**ASSY-CRT-R(P16MAC03RJA)**	**b**
	251C227050	**ASSY-CRT-GR(P16MAC03HKA)**	**b**
	251C227060	**ASSY-CRT-BL(P16MAC03BMB)**	**b**
	251C227070	**ASSY-CRT-R(P21LUB05RJA)**	**gh**
	251C227080	**ASSY-CRT-GR(P21LUB05HKA)**	**gh**
	251C227090	**ASSY-CRT-BL(P21LUB05BMB)**	**gh**
	251C228010	**ASSY-CRT-R(P16MAC03RJA)**	**c**
	251C228020	**ASSY-CRT-GR(P16MAC03HKA)**	**c**
	251C228030	**ASSY-CRT-BL(P16MAC03BMB)**	**c**
	251C228040	**ASSY-CRT-R(P16MAC03RJA)**	**d**
	251C228050	**ASSY-CRT-GR(P16MAC03HKA)**	**d**
	251C228060	**ASSY-CRT-BL(P16MAC03BMB)**	**d**
	251C228070	**ASSY-CRT-R(P16MAC03RJA)**	**e**
	251C228080	**ASSY-CRT-GR(P16MAC03HKA)**	**e**
	251C228090	**ASSY-CRT-BL(P16MAC03BMB)**	**e**
	251C330010	**ASSY-CRT-R(P16MAC03RJA)**	**f**
	251C330020	**ASSY-CRT-GR(P16MAC03HKA)**	**f**
	251C330030	**ASSY-CRT-BL(P16MAC03BMB)**	**f**
		INTEGRATED CIRCUITS	
IC2000	276P090010	IC-C-MOS - Sil9993	
IC2010	261P829010	TR-CHIP - NDC7002N	
IC2020	275P981010	IC-C-MOS - 24LCS22AT/SN	
IC2030	271P069010	IC-C-MOS - CM1210-08MS	
IC2040	271P072020	IC - LD29150DT33	
IC2050	271P099010	IC - LD29150PT50R	
IC2300	276P109010	IC-C-MOS - CS4334-KS	
IC2K01	271P061010	IC - CXA2189Q	
IC2L01	271P078010	IC - MM1566AJBE	
IC2L41	271P078010	IC - MM1566AJBE	
IC2M01	275P947010	IC-C-MOS - UPD64083	
IC2M02	272P379020	IC - LM1881MX (NSC)	
IC2N01	270P658030	IC - CXA2019AQ/T4	
IC2N41	270P703010	IC - BA7657F	
IC2P01	270P658030	IC - CXA2019AQ/T4	
IC2P41	270P703010	IC - BA7657F	
IC2V00	275P733010	IC-C-MOS - CXA2150AQ	
IC2V01	271P068010	IC - LM324AD	
IC3002	276P109010	IC-C-MOS - CS4334-KS	
IC3003	270P938010	IC - MC33202D	
IC3004	275P731020	IC-C-MOS - MSP3445G-QI-B8-V3	
IC3005	275P278010	IC-C-MOS - TC74LVX14FT	
IC3006	270P838010	IC-C-MOS - NJM2520M	
IC3007	270P838010	IC-C-MOS - NJM2520M	
IC3E01	270P750010	IC - LA4663	
IC3J01	271P060010	IC - CXA2188Q	
IC4B01	**270P261020**	**IC - TDA8177**	
IC5A00	**267P163010**	**HIC - MSPAD401**	
IC5A01	**271P068010**	**IC - LM324AD**	
IC5A02	**271P067010**	**IC - LM339AD**	
IC5A03	**270P704010**	**IC - LM4040BIZ-10.0**	
IC5A04	271P062010	IC - BA9759F	
IC6B01	**270P667010**	**IC - TDA6120Q**	
IC6G01	**270P667010**	**IC - TDA6120Q**	
IC6R01	**270P667010**	**IC - TDA6120Q**	

Ref #	Part #	Part Name & Description	[#]
IC7A00	**276P087010**	**IC-C-MOS - M306V7MG-086FP**	
IC7A02	270P706020	IC - MAX823REUK	
IC7D00	275P278010	IC-C-MOS - TC74LVX14FT	
IC7D01	270P818020	IC - CXA3506R	
IC7DA1	267P176010	HIC - AF-9412	
IC7DB0	271P072020	IC - LD29150DT33	
IC7DC0	271P072040	IC - LD29150DT18R	
IC7E01	275P894010	IC-C-MOS - AD9883AKST-110	
IC7EA0	275P663030	IC-C-MOS - M4A3-32/32-5VC-48	
IC7H00	276P106010	IC-C-MOS - MB87M1823PFV-ES-BND	
IC7K21	270P831010	IC-C-MOS - OPA2350PA	
IC7M00	276P091010	IC-C-MOS - M12L64322A-6T	
IC7N00	270P997010	IC-C-MOS - SM5301AS	
IC7P01	275P943030	IC-C-MOS - PIC18F252T-I/SO030	
IC7P02	271P023010	IC - SN74CBTD1G125DBVR	
IC7P03	263P154010	IC-C-MOS - SN74HC132DB	
IC7Q01	275P533010	IC-C-MOS - M24C64WM6T	
IC8001	276P030020	IC-C-MOS - 215H31AGA12	
IC8002	270P706020	IC - MAX823REUK	
IC8003	276P064010	IC-C-MOS - SN74LVC1G125DBVR	
IC80E1	275P657050	IC-C-MOS - 24LC256T-I/SN	
IC80E3	270P880010	IC - 24LC64I/SN	
IC8101	271P033010	IC - LP2996MRX	
IC8102	276P029020	IC-C-MOS - NT5DS16M16BT-5T	
IC8103	276P029020	IC-C-MOS - NT5DS16M16BT-5T	
IC8104	276P029020	IC-C-MOS - NT5DS16M16BT-5T	dg
IC8105	276P029020	IC-C-MOS - NT5DS16M16BT-5T	dg
IC81A1	270P991010	IC - IRU3037CS	
IC81A2	261P135010	FET-HEX - IRF7313	
IC81A3	270P879020	IC - SC1566I5M-1.8.TR	
IC81A4	270P992010	IC - BA18BC0FP	
IC81A5	270P879020	IC - SC1566I5M-1.8.TR	
IC81A6	270P037020	IC - MIC29150-X.X BU	
IC81A7	270P999010	IC - NJM2370R09	
IC81A8	271P081010	IC - BA00CC0WFP	
IC8205	276P042010	IC-C-MOS - MIC2544-1BM	
IC8211	276P029020	IC-C-MOS - NT5DS16M16BT-5T	
IC8212	276P029020	IC-C-MOS - NT5DS16M16BT-5T	
IC8280	275P955010	IC-C-MOS - RTC-8564JE	
IC8301	275P677010	IC-C-MOS - SN74LVC573APWR	
IC8302	275P677010	IC-C-MOS - SN74LVC573APWR	
IC8303	275P677010	IC-C-MOS - SN74LVC573APWR	
IC8305	275P956010	IC-C-MOS - MD2811-D16-V3	
IC8307	275P983020	IC-C-MOS - ST16C650ACQ48	
IC8308	276P077010	IC-C-MOS - ST013T	dg
IC8309	275P660020	IC-C-MOS - CS4341-KSR	
IC8310	275P270010	IC-C-MOS - M66010GP	
IC8311	275P769010	IC-C-MOS - TC74AC157FT	dg
IC8312	270P938010	IC - MC33202D	
IC8313	275P731020	IC-C-MOS - MSP3445G-QI-B8-V3	
IC8314	275P677010	IC-C-MOS - SN74LVC573APWR	
IC8315	275P464010	IC-C-MOS - TC7WH14FK	
IC8316	276P064010	IC-C-MOS - SN74LVC1G125DBVR	dg
IC8401	275P624010	IC-C-MOS - TSB42AA4	
IC8402	275P686010	IC-C-MOS - TSB41AB3PFP	
IC8501	275P679010	IC-C-MOS - TC74LCX74FT	
IC8502	275P124040	IC-C-MOS - SN74LVC245APWR	
IC8503	275P677010	IC-C-MOS - SN74LVC573APWR	

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
IC8504	271P036020	IC - TPS2221PWPR	
IC8505	275P677010	IC-C-MOS - SN74LVC573APWR	
IC8506	276P065020	IC-C-MOS - CIMAX(103563)	
IC8507	275P680010	IC-C-MOS - TC74VCX257FT	
IC8508	275P675010	IC-C-MOS - SN74LV125APWR	
IC8509	271P036020	IC - TPS2221PWPR	
IC8708	271P072030	IC - LD29150DT50	
IC8709	271P082010	IC - LD1117DT12	
IC8710	271P072010	IC - LD29150DT25	
IC8719	271P023010	IC - SN74CBTD1G125DBVR	
IC8720	271P023010	IC - SN74CBTD1G125DBVR	
IC8721	270P677030	IC - BAO9FP	
IC8800	270P877010	IC - UPC3217GV	
IC8801	270P877010	IC - UPC3217GV	
IC8802	275P464010	IC-C-MOS - TC7WH14FK	
IC8805	271P064010	IC - TA75S01F	
IC8806	271P039010	IC-C-MOS - NXT2003 100C	
IC8C01	**267P173010**	**HIC - STK394-250**	
IC8C02	**267P173010**	**HIC - STK394-250**	
IC8D00	276P088010	IC-C-MOS - CM0038AF	
IC8D01	275P222020	IC-C-MOS - M24C32MN6T	
IC8E00	270P751010	IC - TL084CD	
IC8E01	270P751010	IC - TL084CD	
IC8E02	270P751010	IC - TL084CD	
IC8E03	275P721020	IC-C-MOS - CD0031CM	
IC9A20	**267P175010**	**HIC - STR-W6735**	
IC9A21	**270P816010**	**IC - NJM431L**	
IC9A50	**267P161010**	**HIC - STR-F6428S**	
IC9C01	271P071020	IC - BA09SFP	
IC9C02	271P099010	IC - LD29150PT50R	
IC9C03	271P099010	IC - LD29150PT50R	
IC9C04	271P071010	IC - BA033SFP	
IC9C05	271P071020	IC - BA09SFP	
IC9C21	271P072020	IC - LD29150DT33	
IC9C41	271P072030	IC - LD29150DT50	
IC9C61	271P072010	IC - LD29150DT25	
IC9M01	270P677010	IC - BA033FP	
IC9M02	270P992020	IC - BA25BC0FP	

TRANSISTORS

CHIP Type Transistors (Listed by Part No.)

Part No.	Description
260P806010	DTA124EK/UN2112
260P817030	2SA1037K-S
260P817050	2SA1037K-R,S/2SB709AI-R,S
260P817080	2SA1037K-R,S
260P818010	2SC2412K-Q
260P818030	2SC2412K-S
260P818050	2SC2412K-R,S/2SD601AI-R,S
260P818080	2SC2412K-R,S
260P836090	2SC3326-A,B
260P846030	DTC143ZKAT146

Ref #	Part #	Part Name & Description	[#]

TRANSISTORS

Conventional Transistors (By Ref #)

Q2V30	260C004020	TR - 2SC1740S-R,S/2SC3311A-R,S
Q5A04	261P149010	TR - 2SJ585LS
Q5A07	260C416030	TR - 2SC2274-F/2SC2274K-F
Q5A09	260C255040	TR - 2SA950-Y
Q5A31	**261P122010**	**TR - 2SC5778**
Q5A32	261P155010	TR - 2SK2169
Q5A34	261P150010	TR - 2SA1207
Q5A36	260P630010	TR - 2SD2012
Q5A41	261P151010	TR - 2SC2909
Q5A51	**261P142010**	**TR - 2SK2847**
Q5H03	260C001040	TR - 2SC2603-G/2SC1740S-E
Q5H04	260C001040	TR - 2SC2603-G/2SC1740S-E
Q5H05	260C001040	TR - 2SC2603-G/2SC1740S-E
Q5H06	260C001060	TR - 2SA1115-F/2SA933S-S
Q5H09	260C001030	TR - 2SC2603-F,G/2SC1740S
Q5H10	260C001060	TR - 2SA1115-F/2SA933S-S
Q5H11	260P644040	TR - 2SA1535-R
Q5H12	260P647040	TR - 2SC3944-R
Q5K01	260C004050	TR - 2SA933S-R,S/2SA1309A-R,S
Q5K02	261P151010	TR - 2SC2909
Q5K03	260C004010	TR - 2SC1740S-R,S/2SC3311A-R,S
Q5K04	261P151010	TR - 2SC2909
Q5K05	261P150010	TR - 2SA1207
Q5K06	261P152010	TR - 2SC3116
Q5K07	261P152010	TR - 2SC3116
Q5K08	260C004050	TR - 2SA933S-R,S/2SA1309A-R,S
Q5K09	261P214010	TR - 2SC4634LS
Q5K50	261P214010	TR - 2SC4634LS
Q6B01	260C001010	TR - 2SC2603-E,F
Q6B02	260C001050	TR - 2SA1115-E,F/2SA933S
Q6B03	260C001050	TR - 2SA1115-E,F/2SA933S
Q6G01	260C001010	TR - 2SC2603-E,F
Q6R01	260C001010	TR - 2SC2603-E,F
Q7K21	260C004010	TR - 2SC1740S-R,S/2SC3311A-R,S
Q7P22	261P114010	TR - 2SA1585STPR
Q8701	261P026010	TR - 2SC3356
Q9A21	260P630010	TR - 2SD2012
Q9A50	260C416030	TR - 2SC2274-F/2SC2274K-F

DIODES

D2760	264P828010	D-CHIP - DAN202U/MA142WK
D2761	264P828010	D-CHIP - DAN202U/MA142WK
D2770	262P805050	D-CHIP - UDZS5.1B
D2771	264P828010	D-CHIP - DAN202U/MA142WK
D2W01	264P828010	D-CHIP - DAN202U/MA142WK
D2W02	264P828010	D-CHIP - DAN202U/MA142WK
D2W03	264P828010	D-CHIP - DAN202U/MA142WK
D2W04	264P828010	D-CHIP - DAN202U/MA142WK
D4B01	264D056020	DIODE - S5500D/EM1Z/ERB12-02RK
D4B04	264P828010	D-CHIP - DAN202U/MA142WK
D4B05	264P828010	D-CHIP - DAN202U/MA142WK
D5A01	264P045080	DIODE - 1S2076A/1S2471OM
D5A02	264P045080	DIODE - 1S2076A/1S2471OM

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
D5A03	264P045080	DIODE - 1S2076A/1S2471OM	
D5A04	264P045080	DIODE - 1S2076A/1S2471OM	
D5A05	264P466040	DIODE - EQA02-15AB/RD16EB1	
D5A06	262P085010	DIODE - 11EFS2N-TA2B5	
D5A12	264P045080	DIODE - 1S2076A/1S2471OM	
D5A13	264P045080	DIODE - 1S2076A/1S2471OM	
D5A14	264P045080	DIODE - 1S2076A/1S2471OM	
D5A33	262P129010	DIODE - 30PRA20-FC5	
D5A34	264P460060	DIODE - EQA02-05C/RD5.1EB1	
D5A35	264P045080	DIODE - 1S2076A/1S2471OM	
D5A36	264P045080	DIODE - 1S2076A/1S2471OM	
D5A37	264D056020	DIODE - S5500D/EM1Z/ERB12-02RK	
D5A51	**262P039010**	**DIODE - BYW96E/20**	
D5A52	**264P899010**	**DIODE - BYV26E**	
D5A53	264P466040	DIODE - EQA02-15AB/RD16EB1	
D5A54	**262P085010**	**DIODE - 11EFS2N-TA2B5**	
D5A55	**262P085010**	**DIODE - 11EFS2N-TA2B5**	
D5A56	264P045080	DIODE - 1S2076A/1S2471OM	
D5A57	**262P085010**	**DIODE - 11EFS2N-TA2B5**	
D5A58	264P045080	DIODE - 1S2076A/1S2471OM	
D5A60	**264P463040**	**DIODE - RD9.1EB1**	
D5H01	264P045080	DIODE - 1S2076A/1S2471OM	
D5H02	264P045080	DIODE - 1S2076A/1S2471OM	
D5K00	264P528030	DIODE - RP 1H	
D5K01	264P528030	DIODE - RP 1H	
D6B00	262P063010	DIODE - 1SS244	
D6B07	262P063010	DIODE - 1SS244	
D6B08	262P063010	DIODE - 1SS244	
D6G00	262P063010	DIODE - 1SS244	
D6G07	262P063010	DIODE - 1SS244	
D6G08	262P063010	DIODE - 1SS244	
D6R00	262P063010	DIODE - 1SS244	
D6R07	262P063010	DIODE - 1SS244	
D6R08	262P063010	DIODE - 1SS244	
D7K21	268P100010	DIODE-PHOTO - SFH235FA	
D7K22	264P045080	DIODE - 1S2076A/1S2471OM	
D7L21	264P212020	D-LED - LN31GPH	abdeg
D7L41	264P212020	D-LED - LN31GPH	cfh
D7R03	264P828010	D-CHIP - DAN202U/MA142WK	
D81A1	264P828010	D-CHIP - DAN202U/MA142WK	
D81A2	264P828010	D-CHIP - DAN202U/MA142WK	
D81A3	264P828010	D-CHIP - DAN202U/MA142WK	
D81A4	262P090010	DIODE - M1FP3	
D81A5	264P458050	DIODE - RD3.9EB1	
D8201	264P846010	DIODE-CHIP - MA732	
D8202	264P846010	DIODE-CHIP - MA732	
D8203	264P846010	DIODE-CHIP - MA732	
D8204	264P846010	DIODE-CHIP - MA732	
D8280	264P808010	DIODE-CHIP - DAN202K	
D8800	262P089010	DIODE - MA2S728	
D8802	262P071070	DIODE-LE - SML-210FT	
D8803	262P071070	DIODE-LE - SML-210FT	
D8805	262P089010	DIODE - MA2S728	
D8C03	262P817010	DIODE-CHIP - PTZ9.1B	
D8C04	262P817010	DIODE-CHIP - PTZ9.1B	
D9A01	**262P031010**	**DIODE - D6SB80**	
D9A02	264P045080	DIODE - 1S2076A/1S2471OM	
D9A03	264P461050	DIODE - EQA02-06B/RD5.6EB3	
D9A04	264P045080	DIODE - 1S2076A/1S2471OM	
D9A20	264P045080	DIODE - 1S2076A/1S2471OM	
D9A21	264P899010	DIODE - BYV26E	
D9A22	264P825040	DIODE - ERA15-08	
D9A23	262P085010	DIODE - 11EFS2N-TA2B5	
D9A24	264P045080	DIODE - 1S2076A/1S2471OM	
D9A25	262P085010	DIODE - 11EFS2N-TA2B5	
D9A26	262P128010	DIODE - FSH05A06	
D9A27	262P127010	DIODE - FSH05A03L	
D9A28	264P045080	DIODE - 1S2076A/1S2471OM	
D9A29	264P045080	DIODE - 1S2076A/1S2471OM	
D9A30	264P470070	DIODE - EQA02-32B/RD33EB3	
D9A31	264P045080	DIODE - 1S2076A/1S2471OM	
D9A50	264P045080	DIODE - 1S2076A/1S2471OM	
D9A51	264P045080	DIODE - 1S2076A/1S2471OM	
D9A52	264P045080	DIODE - 1S2076A/1S2471OM	
D9A53	264P045080	DIODE - 1S2076A/1S2471OM	
D9A54	262P085010	DIODE - 11EFS2N-TA2B5	
D9A55	264P045080	DIODE - 1S2076A/1S2471OM	
D9A56	262P083010	DIODE - FSF05A20	
D9A57	264P899010	DIODE - BYV26E	
D9A58	262P088010	DIODE - 31DF4-FC5	
D9A60	262P129010	DIODE - 30PRA20-FC5	
D9A61	262P129010	DIODE - 30PRA20-FC5	
D9A68	264P469070	DIODE - EQA02-28A/RD27EB4	
D9A69	264P527020	DIODE - AK04	

COILS

L1H01	321C114010	COIL-RF - 2200MH-J	
L1H02	325C461030	COIL-PEAKING - 10MH-K	
L1H51	321C114010	COIL-RF - 2200MH-J	
L1H52	325C461030	COIL-PEAKING - 10MH-K	
L2011	409P777080	EMI-F-CHIP - BLM21P221S	
L2012	409P777080	EMI-F-CHIP - BLM21P221S	
L2061	409P777080	EMI-F-CHIP - BLM21P221S	
L2071	409P777080	EMI-F-CHIP - BLM21P221S	
L2111	409P777080	EMI-F-CHIP - BLM21P221S	
L2121	409P777080	EMI-F-CHIP - BLM21P221S	
L2141	409P777080	EMI-F-CHIP - BLM21P221S	
L2151	409P777080	EMI-F-CHIP - BLM21P221S	
L2231	409P777080	EMI-F-CHIP - BLM21P221S	
L2271	409P865020	EMI-F-CHIP - BLM11A601S	
L2300	409P923060	EMI-F-CHIP - BLM21B272S	
L2301	409P865020	EMI-F-CHIP - BLM11A601S	
L2311	409P865020	EMI-F-CHIP - BLM11A601S	
L2321	409P865020	EMI-F-CHIP - BLM11A601S	
L2331	409P865020	EMI-F-CHIP - BLM11A601S	
L2341	409P865020	EMI-F-CHIP - BLM11A601S	
L2711	409P865020	EMI-F-CHIP - BLM11A601S	
L2721	409P865020	EMI-F-CHIP - BLM11A601S	
L2761	409P777080	EMI-F-CHIP - BLM21P221S	
L2801	409P777080	EMI-F-CHIP - BLM21P221S	
L2821	409P777080	EMI-F-CHIP - BLM21P221S	
L2K01	325C461030	COIL-PEAKING - 10MH-K	
L2K09	325C461030	COIL-PEAKING - 10MH-K	
L2K58	325C461030	COIL-PEAKING - 10MH-K	
L2K67	325C461030	COIL-PEAKING - 10MH-K	

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
L2L01	325C461030	COIL-PEAKING - 10MH-K	
L2L61	325C461030	COIL-PEAKING - 10MH-K	
L2M21	325C461030	COIL-PEAKING - 10MH-K	
L2M31	409P777080	EMI-F-CHIP - BLM21P221S	
L2M35	325C461050	COIL-PEAKING - 15MH-K	
L2M36	325C461030	COIL-PEAKING - 10MH-K	
L2M38	409P777080	EMI-F-CHIP - BLM21P221S	
L2M40	325C461030	COIL-PEAKING - 10MH-K	
L2M41	325C461030	COIL-PEAKING - 10MH-K	
L2M45	409P777080	EMI-F-CHIP - BLM21P221S	
L2M46	409P777080	EMI-F-CHIP - BLM21P221S	
L2M50	325C461000	COIL-PEAKING - 5.6MH-K	
L2M53	325C461030	COIL-PEAKING - 10MH-K	
L2M70	325C461030	COIL-PEAKING - 10MH-K	
L2M71	325C461030	COIL-PEAKING - 10MH-K	
L2M77	325C461030	COIL-PEAKING - 10MH-K	
L2M81	409P777080	EMI-F-CHIP - BLM21P221S	
L2N03	325C461030	COIL-PEAKING - 10MH-K	
L2N25	409P777080	EMI-F-CHIP - BLM21P221S	
L2N60	409P777080	EMI-F-CHIP - BLM21P221S	
L2P03	325C461030	COIL-PEAKING - 10MH-K	
L2P25	409P777080	EMI-F-CHIP - BLM21P221S	
L2P60	409P777080	EMI-F-CHIP - BLM21P221S	
L2V19	325C461010	COIL-PEAKING - 6.8MH-K	
L2V55	325C461010	COIL-PEAKING - 6.8MH-K	
L2V61	325C461010	COIL-PEAKING - 6.8MH-K	
L2W02	409P923060	EMI-F-CHIP - BLM21B272S	
L2W03	409P923060	EMI-F-CHIP - BLM21B272S	
L2W04	409P923060	EMI-F-CHIP - BLM21B272S	
L3020	409P923060	EMI-F-CHIP - BLM21B272S	
L3034	409P923060	EMI-F-CHIP - BLM21B272S	
L3048	409P923060	EMI-F-CHIP - BLM21B272S	
L3049	409P923060	EMI-F-CHIP - BLM21B272S	
L3050	409P923060	EMI-F-CHIP - BLM21B272S	
L3054	409P923060	EMI-F-CHIP - BLM21B272S	
L4B01	321C140060	COIL-RF - 2.7MH-M	
L5A01	321C141070	COIL-RF - 22MH-K	
L5A02	411D009020	FERRITE-CORE - ZBF503D-01	
L5A03	411D009020	FERRITE-CORE - ZBF503D-01	
L5A22	333P059020	COIL-HORIZ-LIN	cdefgh
L5A34	321C140060	COIL-RF - 2.7MH-M	
L5A51	321C151010	COIL-RF - 6.8MH-M	
L5A54	411D009020	FERRITE-CORE - ZBF503D-01	
L7A16	409P777050	EMI-F-CHIP - BLM21B201S	
L7A19	409P777050	EMI-F-CHIP - BLM21B201S	
L7A88	409P777050	EMI-F-CHIP - BLM21B201S	
L7A90	409P777050	EMI-F-CHIP - BLM21B201S	
L7A91	409P777050	EMI-F-CHIP - BLM21B201S	
L7A99	409P777050	EMI-F-CHIP - BLM21B201S	
L7D16	325C420070	COIL-CHIP - 10MH-K	
L7DA7	325C420070	COIL-CHIP - 10MH-K	
L7DF4	409P777080	EMI-F-CHIP - BLM21P221S	
L7DF8	325C420070	COIL-CHIP - 10MH-K	
L7E34	409P777080	EMI-F-CHIP - BLM21P221S	
L7E42	409P777080	EMI-F-CHIP - BLM21P221S	
L7E69	409P777080	EMI-F-CHIP - BLM21P221S	
L7EB7	409P777080	EMI-F-CHIP - BLM21P221S	
L7H01	409P777080	EMI-F-CHIP - BLM21P221S	

Ref #	Part #	Part Name & Description	[#]
L7H04	409P777080	EMI-F-CHIP - BLM21P221S	
L7H23	409P777080	EMI-F-CHIP - BLM21P221S	
L7H29	409P777080	EMI-F-CHIP - BLM21P221S	
L7H49	409P777080	EMI-F-CHIP - BLM21P221S	
L7H66	409P777080	EMI-F-CHIP - BLM21P221S	
L7H76	409P777080	EMI-F-CHIP - BLM21P221S	
L7H95	409P865020	EMI-F-CHIP - BLM11A601S	
L7H96	409P865020	EMI-F-CHIP - BLM11A601S	
L7J13	409P777080	EMI-F-CHIP - BLM21P221S	
L7J23	325C420070	COIL-CHIP - 10MH-K	
L7J38	409P777080	EMI-F-CHIP - BLM21P221S	
L7J44	409P777080	EMI-F-CHIP - BLM21P221S	
L7K01	325C121030	COIL-PEAKING - 10MH-K	
L7M90	409P777080	EMI-F-CHIP - BLM21P221S	
L7N24	325C420070	COIL-CHIP - 10MH-K	
L7P14	409P777050	EMI-F-CHIP - BLM21B201S	
L7P20	409P777050	EMI-F-CHIP - BLM21B201S	
L7Q31	409P777080	EMI-F-CHIP - BLM21P221S	
L7R08	409P777050	EMI-F-CHIP - BLM21B201S	
L8001	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8002	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8003	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8004	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8005	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8006	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8007	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8008	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8009	409P777080	EMI-F-CHIP - BLM21P221S	
L8012	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8013	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L81A1	321C140060	COIL-RF - 2.7MH-M	
L81A2	351P250010	COIL-CHOKE - GSTC6018-100M	
L81A3	409P777080	EMI-F-CHIP - BLM21P221S	
L81A4	321C140060	COIL-RF - 2.7MH-M	
L81A5	321C140060	COIL-RF - 2.7MH-M	
L81A6	409P777080	EMI-F-CHIP - BLM21P221S	
L81A7	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L81A8	409P777080	EMI-F-CHIP - BLM21P221S	
L8202	409P777080	EMI-F-CHIP - BLM21P221S	
L8203	409P777080	EMI-F-CHIP - BLM21P221S	
L8204	409P777080	EMI-F-CHIP - BLM21P221S	
L8205	409P777080	EMI-F-CHIP - BLM21P221S	
L8206	351P265010	COIL-CHOKE-CHIP	
L8207	351P265010	COIL-CHOKE-CHIP	
L8280	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8301	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8304	325C501010	COIL-CHIP - ALQM21NNR47K10	
L8305	325C501010	COIL-CHIP - ALQM21NNR47K10	
L8307	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8309	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	dg
L8310	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	dg
L8311	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	dg
L8312	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	dg
L8313	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8314	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8315	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8316	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8320	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
L8321	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8322	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8323	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8324	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8326	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8329	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8331	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8332	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8401	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8403	409P777080	EMI-F-CHIP - BLM21P221S	
L8404	409P777080	EMI-F-CHIP - BLM21P221S	
L8411	351P265020	COIL-CHIP - ACM2012-201-2P	
L8412	351P265020	COIL-CHIP - ACM2012-201-2P	
L8413	351P265020	COIL-CHIP - ACM2012-201-2P	
L8414	351P265020	COIL-CHIP - ACM2012-201-2P	
L8415	351P265020	COIL-CHIP - ACM2012-201-2P	
L8416	351P265020	COIL-CHIP - ACM2012-201-2P	
L8501	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8502	409P777080	EMI-F-CHIP - BLM21P221S	
L8503	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8504	409P777080	EMI-F-CHIP - BLM21P221S	
L8505	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8506	409P777080	EMI-F-CHIP - BLM21P221S	
L8507	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8508	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8509	409P865080	EMI-FILTER-CHIP - BLM18PG600SN1	
L8510	409P777080	EMI-F-CHIP - BLM21P221S	
L8511	409P777080	EMI-F-CHIP - BLM21P221S	
L8512	409P777080	EMI-F-CHIP - BLM21P221S	
L8701	409P923060	EMI-F-CHIP - BLM21B272S	
L8702	409P923060	EMI-F-CHIP - BLM21B272S	
L8703	409P923060	EMI-F-CHIP - BLM21B272S	
L8704	409P923060	EMI-F-CHIP - BLM21B272S	
L8706	409P923060	EMI-F-CHIP - BLM21B272S	
L8711	325C414030	COIL-CHIP - 0.22MH-J	
L8717	409P923060	EMI-F-CHIP - BLM21B272S	
L8718	409P923060	EMI-F-CHIP - BLM21B272S	
L8723	409P923060	EMI-F-CHIP - BLM21B272S	
L8725	409P923060	EMI-F-CHIP - BLM21B272S	
L8726	409P923060	EMI-F-CHIP - BLM21B272S	
L8727	409P923060	EMI-F-CHIP - BLM21B272S	
L8736	409P923060	EMI-F-CHIP - BLM21B272S	
L8802	409P923060	EMI-F-CHIP - BLM21B272S	
L8803	409P923060	EMI-F-CHIP - BLM21B272S	
L8804	409P923060	EMI-F-CHIP - BLM21B272S	
L8805	409P923060	EMI-F-CHIP - BLM21B272S	
L8808	409P923060	EMI-F-CHIP - BLM21B272S	
L8809	325C410040	COIL-CHIP - 1.8MH-J	
L8810	409P923060	EMI-F-CHIP - BLM21B272S	
L8811	409P923060	EMI-F-CHIP - BLM21B272S	
L8814	325C141070	COIL-CHIP - 22MH-K/J	
L8815	409P923060	EMI-F-CHIP - BLM21B272S	
L8824	409P923060	EMI-F-CHIP - BLM21B272S	
L8C01	321C141070	COIL-RF - 22MH-K	
L8C02	321C141070	COIL-RF - 22MH-K	
L8D01	409P777080	EMI-F-CHIP - BLM21P221S	
L8D02	409P777080	EMI-F-CHIP - BLM21P221S	
L8D03	409P777080	EMI-F-CHIP - BLM21P221S	
L8D04	409P777080	EMI-F-CHIP - BLM21P221S	

Ref #	Part #	Part Name & Description	[#]
L8D05	325C461030	COIL-PEAKING - 10MH-K	
L8D06	409P777080	EMI-F-CHIP - BLM21P221S	
L8D07	409P777080	EMI-F-CHIP - BLM21P221S	
L8D08	325C461030	COIL-PEAKING - 10MH-K	
L8D09	325C461030	COIL-PEAKING - 10MH-K	
L8G00	409P777080	EMI-F-CHIP - BLM21P221S	
L8G01	409P777080	EMI-F-CHIP - BLM21P221S	
L9A21	321C141010	COIL-RF - 6.8MH-M	
L9A22	321C141030	COIL-RF - 10MH-K	
L9A23	321C141030	COIL-RF - 10MH-K	
L9A50	411D009020	FERRITE-CORE - ZBF503D-01	
L9A51	321C141010	COIL-RF - 6.8MH-M	
L9A52	411D009020	FERRITE-CORE - ZBF503D-01	
L9A53	321C141010	COIL-RF - 6.8MH-M	
L9A54	411D009020	FERRITE-CORE - ZBF503D-01	
L9A55	321C142030	COIL-RF - 68MH-K	
L9A56	411D009020	FERRITE-CORE - ZBF503D-01	
L9A57	321C141010	COIL-RF - 6.8MH-M	
L9A62	321C141010	COIL-RF - 6.8MH-M	
L9A63	321C141070	COIL-RF - 22MH-K	
L9A64	321C141070	COIL-RF - 22MH-K	
L9D00	**351P266010**	**LINE-FILTER - ELF22V050BN**	
L9D01	**351P266010**	**LINE-FILTER - ELF22V050BN**	
LC2H40	409P777020	EMI-F-CHIP - BLM21A05	
LC2H41	409P777020	EMI-F-CHIP - BLM21A05	
LC2H42	409P777020	EMI-F-CHIP - BLM21A05	
LC2H43	409P777020	EMI-F-CHIP - BLM21A05	
LC2H44	409P777020	EMI-F-CHIP - BLM21A05	
LC2H45	409P777020	EMI-F-CHIP - BLM21A05	
LC81A1	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8301	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8302	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8303	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8304	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8305	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8306	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8307	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8308	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8309	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8310	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8311	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8312	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8313	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8314	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8315	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8316	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8317	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8318	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8319	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8501	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8502	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8503	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8504	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8505	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8506	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8507	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8508	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8509	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8511	409P945010	EMI-F-CHIP - NFL21SP506X13CD	

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
LC8512	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8514	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8515	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8516	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8517	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8518	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8519	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8520	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8521	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8522	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8523	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8524	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8525	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8526	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8527	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8528	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8529	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8530	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LC8531	409P945010	EMI-F-CHIP - NFL21SP506X13CD	
LF7D02	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7D04	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7D06	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7D08	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7D10	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7D12	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7D14	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7D16	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7D18	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7D20	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7D22	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7D24	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7H02	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7H04	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7H06	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7H08	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7H10	409P944010	EMI-F-CHIP - NFL21SP107X1	
LF7H13	409P865020	EMI-F-CHIP - BLM11A601S	
LF7H14	409P865020	EMI-F-CHIP - BLM11A601S	
LF7H18	409P865020	EMI-F-CHIP - BLM11A601S	
LF7H20	409P865020	EMI-F-CHIP - BLM11A601S	
LF7H22	409P865020	EMI-F-CHIP - BLM11A601S	
LF7H24	409P865020	EMI-F-CHIP - BLM11A601S	
		TRANSFORMERS	
T5A31	**349P223010**	**TRANS-HORIZ**	
T5A32	**349P224010**	**TRANS-HORIZ-DRIVE**	
T5A51	**334P288010**	**TRANS-FLYBACK**	
T5K01	349P222010	TRANS-DBF	
T9A20	**350P819010**	**TRANS-POWER**	
T9A50	**350P818010**	**TRANS-POWER**	
		VARIABLE RESISTORS	
	129P070020	**VR-FOCUS**	
		RESISTORS	
		CHIP Type Resistors (Listed by Value)	

Ref #	Part #	Part Name & Description	[#]
Part No.	**Value**	**Part No.**	**Value**
103P509050	1/16W 0OHM	103P493020	1/16W 2K-F
103P409050	1/8W 0OHM	103P493030	1/16W 2.2K-F
103P508040	1/16W 2.2-J	103P502090	1/16W 2.2K-J
103P509000	1/16W 6.8-J	103P493040	1/16W 2.4K-F
103P500010	1/16W 10-J	103P493050	1/16W 2.7K-F
103P793020	1/16W 20F	103P503000	1/16W 2.7K-J
103P500050	1/16W 22-J	103P493060	1/16W 3K-F
103P400050	1/10W 22-J	103P493070	1/16W 3.3K-F
103P500060	1/16W 27-J	103P503010	1/16W 3.3K-J
103P910070	1/16W 33-J	103P503020	1/16W 3.9K-J
103P500070	1/16W 33-J	103P494000	1/16W 4.3K-F
103P793080	1/16W 36F	103P494010	1/16W 4.7K-F
103P500080	1/16W 39-J	103P503030	1/16W 4.7K-J
103P794010	1/16W 47-F	103P494020	1/16W 5.1K-F
103P500090	1/16W 47-J	103P494030	1/16W 5.6K-F
103P911000	1/16W 56-J	103P503040	1/16W 5.6K-J
103P501000	1/16W 56-J	103P814040	1/16W 6.2K-D
103P501010	1/16W 68-J	103P503050	1/16W 6.8K-J
103P509090	1/16W 75-J	103P494050	1/16W 6.8K-F
103P794060	1/16W 75-F	103P494070	1/16W 8.2K-F
103P489090	1/4W 75-J	103P503060	1/16W 8.2K-J
103P501020	1/16W 82-J	103P494080	1/16W 9.1K-F
103P794080	1/16W 91F	103P494090	1/16W 10K-F
103P490010	1/16W 100F	103P503070	1/16W 10K-J
103P401030	1/10W 100-J	103P495010	1/16W 12K-F
103P501030	1/16W 100-J	103P503080	1/16W 12K-J
103P501040	1/16W 120-J	103P495020	1/16W 13K-F
103P810050	1/16W 150-D	103P495030	1/16W 15K-F
103P501050	1/16W 150-J	103P503090	1/16W 15K-J
103P401050	1/10W 150-J	103P495040	1/16W 16K-F
103P501060	1/16W 180-J	103P504000	1/16W 18K-J
103P490080	1/16W 200-F	103P495050	1/16W 18K-F
103P501070	1/16W 220-J	103P504010	1/16W 22K-J
103P481070	1/4W 220-J	103P495070	1/16W 22K-F
103P471010	1/8W 270-F	103P495080	1/16W 24K-F
103P491020	1/16W 300-F	103P495090	1/16W 27K-F
103P501090	1/16W 330-J	103P496000	1/16W 30K-F
103P491040	1/16W 360-F	103P504030	1/16W 33K-J
103P502000	1/16W 390-J	103P496010	1/16W 33K-F
103P491050	1/16W 390-F	103P496040	1/16W 43K-F
103P502010	1/16W 470-J	103P504050	1/16W 47K-J
103P491070	1/16W 470-F	103P496050	1/16W 47K-F
103P491080	1/16W 510-F	103P504060	1/16W 56K-J
103P502020	1/16W 560-J	103P496080	1/16W 62K-F
103P492000	1/16W 620-F	103P504070	1/16W 68K-J
103P492010	1/16W 680-F	103P496090	1/16W 68K-F
103P502030	1/16W 680-J	103P504080	1/16W 82K-J
103P492020	1/16W 750-F	103P497030	1/16W 100K-F
103P502040	1/16W 820-J	103P504090	1/16W 100K-J
103P492030	1/16W 820-F	103P505000	1/16W 120K-J
103P492050	1/16W 1K-F	103P497070	1/16W 150K-F
103P502050	1/16W 1K-J	103P505030	1/16W 220K-J
103P492060	1/16W 1.1K-F	103P498020	1/16W 240K-F
103P502060	1/16W 1.2K-J	103P505050	1/16W 330K-J
103P402070	1/8W 1.5K-J	103P505070	1/16W 470K-J
103P472090	1/8W 1.5K-F	103P505090	1/16W 680K-J
103P502070	1/16W 1.5K-J	103P506000	1/16W 820K-J
103P492090	1/16W 1.5K-F	103P506010	1/16W 1M-J
103P502080	1/16W 1.8K-J	103P506070	1/16W 3.3M-J

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]

RESISTORS

Conventional Resistors (By Ref #)

Ref #	Part #	Part Name & Description	[#]
R2J03	103P719090	R-CARBON - 1/4W 75-J	
R2J05	103P719090	R-CARBON - 1/4W 75-J	
R2J07	103P719090	R-CARBON - 1/4W 75-J	
R2V96	109D151050	R-CARBON - 1/4W 75-J	
R3E09	109D151010	R-CARBON - 1/4W 2.2-J	
R3E11	109D151010	R-CARBON - 1/4W 2.2-J	
R3E12	109D151010	R-CARBON - 1/4W 2.2-J	
R3E14	109D151010	R-CARBON - 1/4W 2.2-J	
R4B04	103C178060	R-METAL - 1W 3.3-J	
R4B10	103C188040	R-METAL - 2W 2.2-J	cdefgh
R4B12	103C188040	R-METAL - 2W 2.2-J	
R4B16	109P095010	R-METAL-LIN - 1/4W 5.1K-J	
R4B18	103P338020	R-CARBON-25 - 1/4W 1.5-J	
R4B23	109D151080	R-CARBON - 1/4W 220-J	
R5A16	103P144010	R-CARBON 1/2W 22K-J	
R5A20	103P144050	R-CARBON 1/2W 47K-J	
R5A26	103P761030	R-FUSE - 1/2W 100-J	
R5A32	103P145030	R-CARBON - 1/2W 220K-J	
R5A34	103P143070	R-CARBON 1/2W 10K-J	
R5A35	103P143030	R-CARBON - 1/2W 4.7K-J	
R5A36	103P143070	R-CARBON 1/2W 10K-J	
R5A37	103C393010	R-METAL-P - 3W 3.3K-J	cdefgh
R5A37	103C393030	R-METAL-P - 3W 4.7K-J	ab
R5A38	103C187020	R-METAL - 2W 0.22-J	
R5A39	103P140090	R-CARBON - 1/2W 47-J	
R5A45	109D151090	R-CARBON - 1/4W 33-J	
R5A46	103C391050	R-METAL-P - 3W 150-J	
R5A50	103P711000	R-CARBON - 1/4W 56-J	
R5A62	103P711070	R-CARBON - 1/4W 220-J	
R5A64	103P712010	R-CARBON - 1/4W 470-J	
R5A65	**103P141030**	**R-CARBON - 1/2W 100-J**	
R5A80	109P180010	R-WIRE - 2W 0.16-G	
R5A82	**103P370090**	**R-FUSE - 1/4W 47-J**	
R5A85	109D151030	R-CARBON - 1/4W 4.7-J	
R5A87	103P142060	R-CARBON - 1/2W 1.2K-J	
R5A90	103P711060	R-CARBON - 1/4W 180-J	
R5A93	103P140090	R-CARBON - 1/2W 47-J	
R5A94	103C390060	R-METAL-P - 3W 27-J	
R5B04	103P711030	R-CARBON - 1/4W 100-J	
R5H02	103P758000	R-FUSE - 1/4W 1-J	
R5H07	103P461060	R-METAL - 1/4W 430-F	
R5H11	103P712020	R-CARBON - 1/4W 560-J	
R5H12	103P712020	R-CARBON - 1/4W 560-J	
R5H13	103P712020	R-CARBON - 1/4W 560-J	
R5H16	103P710020	R-CARBON - 1/4W 12-J	
R5H17	103P710020	R-CARBON - 1/4W 12-J	
R5H47	103C392010	R-METAL-P - 3W 470-J	
R5H49	103P714070	R-CARBON - 1/4W 68K-J	
R5H50	103P714070	R-CARBON - 1/4W 68K-J	
R5H55	103P140070	R-CARBON - 1/2W 33-J	
R5H56	103P140070	R-CARBON - 1/2W 33-J	
R5H58	103P148000	R-CARBON - 1/2W 1-J	
R5H59	103C191050	R-METAL - 3W 150-J	
R5H60	103C178080	R-METAL - 1W 4.7-J	

Ref #	Part #	Part Name & Description	[#]
R5K00	103P760060	R-FUSE - 1/2W 27-J	
R5K01	103P760060	R-FUSE - 1/2W 27-J	
R5K02	103P143070	R-CARBON 1/2W 10K-J	
R5K03	103P143070	R-CARBON 1/2W 10K-J	
R5K04	103P760060	R-FUSE - 1/2W 27-J	
R5K05	103P712080	R-CARBON - 1/4W 1.8K-J	
R5K06	103P712030	R-CARBON - 1/4W 680-J	
R5K07	109D151090	R-CARBON - 1/4W 33-J	
R5K08	103P712050	R-CARBON - 1/4W 1K-J	
R5K09	109D151090	R-CARBON - 1/4W 33-J	
R5K10	109D031070	R-COMP - 1/2W 10K-K	
R5K11	103P713070	R-CARBON - 1/4W 10K-J	
R5K12	103P711030	R-CARBON - 1/4W 100-J	
R5K13	103P712030	R-CARBON - 1/4W 680-J	
R5K15	103P144070	R-CARBON - 1/2W 68K-J	
R5K16	103P143070	R-CARBON 1/2W 10K-J	
R5K17	103P145050	R-CARBON - 1/2W 330K-J	
R5K18	103P145050	R-CARBON - 1/2W 330K-J	
R5K19	103P145050	R-CARBON - 1/2W 330K-J	
R5K20	103P145050	R-CARBON - 1/2W 330K-J	
R5K21	103P712050	R-CARBON - 1/4W 1K-J	
R5K22	103P714010	R-CARBON - 1/4W 22K-J	
R5K23	103P713070	R-CARBON - 1/4W 10K-J	
R5K24	103P713050	R-CARBON - 1/4W 6.8K-J	
R5K25	103P712090	R-CARBON - 1/4W 2.2K-J	
R5K26	103P712050	R-CARBON - 1/4W 1K-J	
R5K27	103P713070	R-CARBON - 1/4W 10K-J	
R5K28	103P143070	R-CARBON 1/2W 10K-J	
R5K29	103P146010	R-CARBON - 1/2W 1M-J	
R5K30	103P146010	R-CARBON - 1/2W 1M-J	
R5K31	103P713070	R-CARBON - 1/4W 10K-J	
R5K32	103P714090	R-CARBON - 1/4W 100K-J	
R5K33	103P711080	R-CARBON - 1/4W 270-J	
R5K34	103P143020	R-CARBON - 1/2W 3.9K-J	
R5K35	109D151030	R-CARBON - 1/4W 4.7-J	
R5K36	109D151030	R-CARBON - 1/4W 4.7-J	
R5K37	109D151090	R-CARBON - 1/4W 33-J	
R5K38	109D151090	R-CARBON - 1/4W 33-J	
R5K50	103P714010	R-CARBON - 1/4W 22K-J	
R5K51	103P713030	R-CARBON - 1/4W 4.7K-J	
R5K52	109D031090	R-COMP - 1/2W 470K-K	
R6B01	103P711030	R-CARBON - 1/4W 100-J	
R6B02	103P713090	R-CARBON - 1/4W 15K-J	
R6B03	103P464020	R-METAL - 1/4W 2.4K-F	
R6B04	103P713000	R-CARBON - 1/4W 2.7K-J	
R6B05	103P411010	R-CARBON - 1/4W 68-J	
R6B06	103P462050	R-METAL - 1/4W 1K-F	
R6B07	103P711030	R-CARBON - 1/4W 100-J	
R6B08	103P710010	R-CARBON - 1/4W 10-J	
R6B09	103P711030	R-CARBON - 1/4W 100-J	
R6B10	103P713030	R-CARBON - 1/4W 4.7K-J	
R6B11	103C194020	R-METAL - 3W 27K-J	
R6B13	103P331030	R-CARBON - 1/4W 100-J	
R6B15	103P714090	R-CARBON - 1/4W 100K-J	
R6B16	103P411000	R-CARBON - 1/4W 56-J	
R6B17	101P221030	R-COMP - 1/2W 220-K	
R6B18	103P713040	R-CARBON - 1/4W 5.6K-J	
R6B19	103P713050	R-CARBON - 1/4W 6.8K-J	
R6B20	101P221030	R-COMP - 1/2W 220-K	

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
R6B21	103P467030	R-METAL - 1/4W 100K-F	
R6B22	103P467030	R-METAL - 1/4W 100K-F	
R6B23	103P711030	R-CARBON - 1/4W 100-J	
R6B24	103P713030	R-CARBON - 1/4W 4.7K-J	
R6B25	103P711030	R-CARBON - 1/4W 100-J	
R6B26	103P713050	R-CARBON - 1/4W 6.8K-J	
R6B27	103P711030	R-CARBON - 1/4W 100-J	
R6B31	103P712060	R-CARBON - 1/4W 1.2K-J	
R6G01	103P711030	R-CARBON - 1/4W 100-J	
R6G02	103P713090	R-CARBON - 1/4W 15K-J	
R6G03	103P464020	R-METAL - 1/4W 2.4K-F	
R6G04	103P463040	R-METAL - 1/4W 2.4K-F	
R6G05	103P411010	R-CARBON - 1/4W 68-J	
R6G06	103P462030	R-METAL - 1/4W 820-F	
R6G07	103P711030	R-CARBON - 1/4W 100-J	
R6G08	103P710010	R-CARBON - 1/4W 10-J	
R6G09	103P711030	R-CARBON - 1/4W 100-J	
R6G10	103P713030	R-CARBON - 1/4W 4.7K-J	
R6G11	103C194020	R-METAL - 3W 27K-J	
R6G13	103P331030	R-CARBON - 1/4W 100-J	
R6G15	103P714090	R-CARBON - 1/4W 100K-J	
R6G16	103P411000	R-CARBON - 1/4W 56-J	
R6G17	101P221030	R-COMP - 1/2W 220-K	
R6G20	101P221030	R-COMP - 1/2W 220-K	
R6G21	103P467010	R-METAL - 1/4W 82K-F	
R6G22	103P467010	R-METAL - 1/4W 82K-F	
R6G23	103P711030	R-CARBON - 1/4W 100-J	
R6G31	103P712060	R-CARBON - 1/4W 1.2K-J	
R6R01	103P711030	R-CARBON - 1/4W 100-J	
R6R02	103P713090	R-CARBON - 1/4W 15K-J	
R6R03	103P464020	R-METAL - 1/4W 2.4K-F	
R6R04	103P713000	R-CARBON - 1/4W 2.7K-J	
R6R05	103P411010	R-CARBON - 1/4W 68-J	
R6R06	103P462050	R-METAL - 1/4W 1K-F	
R6R07	103P711030	R-CARBON - 1/4W 100-J	
R6R08	103P710010	R-CARBON - 1/4W 10-J	
R6R09	103P711030	R-CARBON - 1/4W 100-J	
R6R10	103P713030	R-CARBON - 1/4W 4.7K-J	
R6R11	103C194020	R-METAL - 3W 27K-J	
R6R13	103P331030	R-CARBON - 1/4W 100-J	
R6R15	103P714090	R-CARBON - 1/4W 100K-J	
R6R16	103P411000	R-CARBON - 1/4W 56-J	
R6R17	101P221030	R-COMP - 1/2W 220-K	
R6R20	101P221030	R-COMP - 1/2W 220-K	
R6R21	103P467030	R-METAL - 1/4W 100K-F	
R6R22	103P467030	R-METAL - 1/4W 100K-F	
R6R23	103P711030	R-CARBON - 1/4W 100-J	
R6R31	103P712060	R-CARBON - 1/4W 1.2K-J	
R7K01	103P712050	R-CARBON - 1/4W 1K-J	
R7K02	103P713010	R-CARBON - 1/4W 3.3K-J	
R7K21	103P710090	R-CARBON - 1/4W 47-J	
R7K22	103P715030	R-CARBON - 1/4W 220K-J	
R7K23	103P712050	R-CARBON - 1/4W 1K-J	
R7K24	103P713080	R-CARBON - 1/4W 12K-J	
R7K25	103P712050	R-CARBON - 1/4W 1K-J	
R7K26	103P715030	R-CARBON - 1/4W 220K-J	
R7K27	103P713070	R-CARBON - 1/4W 10K-J	
R7K28	103P711050	R-CARBON - 1/4W 150-J	
R7K29	103P712060	R-CARBON - 1/4W 1.2K-J	

Ref #	Part #	Part Name & Description	[#]
R7K30	103P712050	R-CARBON - 1/4W 1K-J	
R7K31	103P715030	R-CARBON - 1/4W 220K-J	
R7K32	103P713030	R-CARBON - 1/4W 4.7K-J	
R7K33	103P712050	R-CARBON - 1/4W 1K-J	
R7K34	103P713000	R-CARBON - 1/4W 2.7K-J	
R7K35	103P711030	R-CARBON - 1/4W 100-J	
R7K36	103P710090	R-CARBON - 1/4W 47-J	
R7L26	103P462090	R-METAL - 1/4W 1.5K-F	abdeg
R7L27	103P463030	R-METAL - 1/4W 2.2K-F	abdeg
R7L28	103P463070	R-METAL - 1/4W 3.3K-F	abdeg
R7L29	103P464030	R-METAL - 1/4W 5.6K-F	abdeg
R7L30	103P465010	R-METAL - 1/4W 12K-F	abdeg
R7L31	103P466010	R-METAL - 1/4W 33K-F	abdeg
R7L32	103P466070	R-METAL - 1/4W 56K-F	abdeg
R7L42	103P466070	R-METAL - 1/4W 56K-F	cfh
R7L44	103P462090	R-METAL - 1/4W 1.5K-F	cfh
R7L45	103P463030	R-METAL - 1/4W 2.2K-F	cfh
R7L46	103P463070	R-METAL - 1/4W 3.3K-F	cfh
R7L47	103P464030	R-METAL - 1/4W 5.6K-F	cfh
R7L48	103P465010	R-METAL - 1/4W 12K-F	cfh
R7L49	103P466010	R-METAL - 1/4W 33K-F	cfh
R7P22	109D151010	R-CARBON - 1/4W 2.2-J	
R7P28	109D151010	R-CARBON - 1/4W 2.2-J	
R8798	103C288040	R-METAL-CP - 2W 2.2-J	
R8C05	103C288070	R-METAL-CP - 2W 3.9-J	
R8C06	103C288070	R-METAL-CP - 2W 3.9-J	
R8C07	103C391050	R-METAL-P - 3W 150-J	
R8C13	103C288070	R-METAL-CP - 2W 3.9-J	
R8C14	103C288070	R-METAL-CP - 2W 3.9-J	
R8C15	103C391050	R-METAL-P - 3W 150-J	
R8C21	103C288070	R-METAL-CP - 2W 3.9-J	
R8C22	103C288070	R-METAL-CP - 2W 3.9-J	
R8C23	103C391050	R-METAL-P - 3W 150-J	
R8C29	103C288070	R-METAL-CP - 2W 3.9-J	
R8C30	103C288070	R-METAL-CP - 2W 3.9-J	
R8C31	103C391050	R-METAL-P - 3W 150-J	
R8C37	103C288070	R-METAL-CP - 2W 3.9-J	
R8C38	103C288070	R-METAL-CP - 2W 3.9-J	
R8C39	103C391050	R-METAL-P - 3W 150-J	
R8C45	103C288070	R-METAL-CP - 2W 3.9-J	
R8C46	103C288070	R-METAL-CP - 2W 3.9-J	
R8C47	103C391050	R-METAL-P - 3W 150-J	
R8C60	103C191090	R-METAL - 3W 330-J	
R8C61	103C191090	R-METAL - 3W 330-J	
R9A02	109P179010	R-CEMENT-PLATE - 6.8-J	
R9A03	**109C010010**	**R-COMP - 1/2W 1M-K**	
R9A05	**109C010010**	**R-COMP - 1/2W 1M-K**	
R9A06	**109C010010**	**R-COMP - 1/2W 1M-K**	
R9A09	103P145030	R-CARBON - 1/2W 220K-J	
R9A11	103P145030	R-CARBON - 1/2W 220K-J	
R9A20	103P144020	R-CARBON - 1/2W 27K-J	
R9A21	103P144020	R-CARBON - 1/2W 27K-J	
R9A22	109P175030	R-WIRE - 2W 0.39-J	
R9A25	103P142050	R-CARBON - 1/2W 1K-J	
R9A26	109D151090	R-CARBON - 1/4W 33-J	
R9A27	109D151050	R-CARBON - 1/4W 75-J	
R9A36	103P142070	R-CARBON - 1/2W 1.5K-J	
R9A38	103P144090	R-CARBON - 1/2W 100K-J	
R9A50	103P143010	R-CARBON - 1/2W 3.3K-J	

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
R9A52	103P140090	R-CARBON - 1/2W 47-J	
R9A54	109P175020	R-WIRE - 2W 0.15-J	
R9A55	109P175010	R-WIRE - 2W 0.12-J	
R9A59	109D151030	R-CARBON - 1/4W 4.7-J	
R9A60	109D151090	R-CARBON - 1/4W 33-J	
R9A64	103P713030	R-CARBON - 1/4W 4.7K-J	
R9A67	103P710050	R-CARBON - 1/4W 22-J	
R9A68	103C390020	R-METAL-P - 3W 12-J	
R9A70	109D151090	R-CARBON - 1/4W 33-J	
R9A71	103P145030	R-CARBON - 1/2W 220K-J	
R9C01	103C298040	R-METAL-CP - 3W 2.2-J	
R9D00	**109D036020**	**R-COMP - 1/2W 4.7M-K**	

CAPACITORS

CHIP Type Capacitors (Listed by Value)

Part No.	Value	Part No.	Value
154P340040	50V 3P-C	141P140050	B50V 470P-K
141P142090	B25V 0.047M-K	141P139090	B16V 0.47M-K
141P143010	B25V 0.068M-K	141P146080	B10V 0.47M-K
154P340090	CH50V 8P-C	154P345030	CH25V 560P-J
141P143020	B16V 0.082M-K	154P345050	CH25V 680P-J
154P341010	CH50V 10P-C	154P345070	CH25V 820P-J
141P142010	B50V 0.01M-K	141P140090	B50V 1000P-K
141P143080	F50V 0.01M-Z	154P345090	CH25V 1000P-J
154P341030	CH50V 12P-J	141P143050	F50V 1000P-Z
154P341050	CH50V 15P-J	141P134070	B16V 1M-K
154P341070	CH50V 18P-J	141P147020	B10V/6.3V 1M-K
154P341090	CH50V 22P-J	181P526010	50V 1M-M
154P342010	CH50V 27P-J	141P144060	F16V 1M-Z
154P342030	CH50V 33P-J	141P141010	B50V 1500P-K
154P342050	CH50V 39P-J	141P141050	B50V 3300P-K
154P342070	CH50V 47P-J	181P506030	50V 3.3M-M
154P340080	CH50V 47P-J	141P141070	B50V 4700P-K
154P342070	CH50V 47P-J	181P524090	35V 4.7M-M 105C
154P352080	SL50V 47P-J	141P141090	B50V 6800P-K
154P342090	CH50V 56P-J	141P142000	B50V 8200P-K
154P343030	CH50V 82P-J	181P502030	16V 10M-M
154P343050	CH50V 100P-J	181P532030	16V 10M-M
141P139030	B25V 0.1M-K	181P522030	16V 10M-M 105C
141P143030	B16V 0.1M-K	181P525000	35V 10M-M 105C
141P144020	F25V 0.1M-Z	181P522040	16V 22M-M 105C
141P134090	F50V 0.1M-Z	181P520010	6.3V 22M-M 105C
141P135080	F50V/25V 0.1M-Z	181P500030	6.3V 47M-M
154P343070	CH50V 120P-J	181P520030	6.3V 47M-M
154P343090	CH50V 150P-J	181P522060	6V 47M-M
141P139050	B25V 0.15 M-K	181P502070	16V 100M-M
154P344030	CH50V 220P-J	181P528000	4V 100M-M 105C
141P140010	B50V 220P-K	181P520040	6.3V 100M-M
154P344050	CH50V 270P-J	181P528010	4V 220M-M 105C
141P138080	B25V 0.33M-K	181P520050	6.3V 220M-M 105C
154P345010	CH50V 470P-J		

Ref #	Part #	Part Name & Description	[#]

CAPACITORS AND TRIMMERS

Conventional Capacitors (By Ref #)

C1H03	181P352040	C-ELEC - 16V 100M-M
C1H05	172P262010	C-M-POLY - 50V 0.047M-J
C1H53	181P352040	C-ELEC - 16V 100M-M
C1H55	172P262010	C-M-POLY - 50V 0.047M-J
C2014	181P355060	C-ELEC - 50V 22M-M
C2016	181P352040	C-ELEC - 16V 100M-M
C2019	181P351070	C-ELEC - 10V 470M-M
C2051	181P352040	C-ELEC - 16V 100M-M
C2054	181P743040	C-ELEC - 16V 330M-M
C2064	181P355060	C-ELEC - 50V 22M-M
C2081	181P355050	C-ELEC - 50V 10M-M
C2114	181P355060	C-ELEC - 50V 22M-M
C2144	181P355060	C-ELEC - 50V 22M-M
C2173	181P355060	C-ELEC - 50V 22M-M
C2213	181P355060	C-ELEC - 50V 22M-M
C2233	181P355050	C-ELEC - 50V 10M-M
C2242	181P355050	C-ELEC - 50V 10M-M
C2762	181P355050	C-ELEC - 50V 10M-M
C2803	181P355050	C-ELEC - 50V 10M-M
C2824	181P355060	C-ELEC - 50V 22M-M
C2K06	181P355050	C-ELEC - 50V 10M-M
C2K10	181P355050	C-ELEC - 50V 10M-M
C2K52	181P352030	C-ELEC - 16V 47M-M
C2K59	181P352030	C-ELEC - 16V 47M-M
C2K62	181P352030	C-ELEC - 16V 47M-M
C2K68	181P352030	C-ELEC - 16V 47M-M
C2K72	181P352030	C-ELEC - 16V 47M-M
C2K73	181P352030	C-ELEC - 16V 47M-M
C2K77	181P352030	C-ELEC - 16V 47M-M
C2L01	181P352030	C-ELEC - 16V 47M-M
C2L08	181P352010	C-ELEC - 16V 22M-M
C2L12	181P352010	C-ELEC - 16V 22M-M
C2L13	181P352040	C-ELEC - 16V 100M-M
C2L31	181P355050	C-ELEC - 50V 10M-M
C2L32	181P122070	C-ELEC-NP - 25V 10M-M
C2L33	181P355050	C-ELEC - 50V 10M-M
C2L34	181P122070	C-ELEC-NP - 25V 10M-M
C2L51	181P355050	C-ELEC - 50V 10M-M
C2L52	181P122070	C-ELEC-NP - 25V 10M-M
C2L53	181P355050	C-ELEC - 50V 10M-M
C2L54	181P122070	C-ELEC-NP - 25V 10M-M
C2L61	181P352030	C-ELEC - 16V 47M-M
C2L67	181P352010	C-ELEC - 16V 22M-M
C2L69	181P352040	C-ELEC - 16V 100M-M
C2L70	181P352010	C-ELEC - 16V 22M-M
C2L72	181P352040	C-ELEC - 16V 100M-M
C2L73	181P352010	C-ELEC - 16V 22M-M
C2M26	181P352040	C-ELEC - 16V 100M-M
C2M28	181P351080	C-ELEC - 10V 1000M-M
C2M29	181P351080	C-ELEC - 10V 1000M-M
C2M31	181P352030	C-ELEC - 16V 47M-M
C2M33	181P352030	C-ELEC - 16V 47M-M
C2M36	181P352040	C-ELEC - 16V 100M-M
C2M38	181P352030	C-ELEC - 16V 47M-M
C2M39	181P352030	C-ELEC - 16V 47M-M

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
C2M39	181P352030	C-ELEC - 16V 47M-M	
C2M43	181P352030	C-ELEC - 16V 47M-M	
C2M44	181P352030	C-ELEC - 16V 47M-M	
C2M54	181P355050	C-ELEC - 50V 10M-M	
C2M56	181P355050	C-ELEC - 50V 10M-M	
C2M59	181P352030	C-ELEC - 16V 47M-M	
C2M64	181P352030	C-ELEC - 16V 47M-M	
C2M73	181P355050	C-ELEC - 50V 10M-M	
C2M75	181P212060	C-ELEC - 16V 47M-M	
C2M77	181P352040	C-ELEC - 16V 100M-M	
C2M80	181P352030	C-ELEC - 16V 47M-M	
C2M88	181P355010	C-ELEC - 50V 1M-M	
C2M89	181P352030	C-ELEC - 16V 47M-M	
C2M98	181P355050	C-ELEC - 50V 10M-M	
C2N01	181P355040	C-ELEC - 50V 4.7M-M	
C2N04	181P352030	C-ELEC - 16V 47M-M	
C2N24	181P352030	C-ELEC - 16V 47M-M	
C2N33	181P355040	C-ELEC - 50V 4.7M-M	
C2N41	181P121070	C-ELEC - 16V 47M-M NP	
C2N45	181P121070	C-ELEC - 16V 47M-M NP	
C2N47	181P121070	C-ELEC - 16V 47M-M NP	
C2N48	181P121070	C-ELEC - 16V 47M-M NP	
C2N50	181P121070	C-ELEC - 16V 47M-M NP	
C2N52	181P121070	C-ELEC - 16V 47M-M NP	
C2N60	181P352030	C-ELEC - 16V 47M-M	
C2P01	181P355040	C-ELEC - 50V 4.7M-M	
C2P04	181P352030	C-ELEC - 16V 47M-M	
C2P24	181P352030	C-ELEC - 16V 47M-M	
C2P33	181P355040	C-ELEC - 50V 4.7M-M	
C2P42	181P121070	C-ELEC - 16V 47M-M NP	
C2P45	181P121070	C-ELEC - 16V 47M-M NP	
C2P47	181P121070	C-ELEC - 16V 47M-M NP	
C2P48	181P121070	C-ELEC - 16V 47M-M NP	
C2P50	181P121070	C-ELEC - 16V 47M-M NP	
C2P52	181P121070	C-ELEC - 16V 47M-M NP	
C2P60	181P352030	C-ELEC - 16V 47M-M	
C2V14	181P352040	C-ELEC - 16V 100M-M	
C2V17	181P355040	C-ELEC - 50V 4.7M-M	
C2V19	181P352040	C-ELEC - 16V 100M-M	
C2V29	181P352040	C-ELEC - 16V 100M-M	
C2V30	181P118010	C-ELEC - 50V 0.68M-M	
C2V32	181P355000	C-ELEC - 50V 0.47M-M	
C2V48	172P166030	C-TF - 50V 0.1M-J	
C2V49	172P166030	C-TF - 50V 0.1M-J	
C2V55	181P352040	C-ELEC - 16V 100M-M	
C2V57	181P355060	C-ELEC - 50V 22M-M	
C2V61	181P352040	C-ELEC - 16V 100M-M	
C2V62	181P355050	C-ELEC - 50V 10M-M	
C2W02	181P352080	C-ELEC - 16V 1000M-M	
C2W05	181P352030	C-ELEC - 16V 47M-M	
C2W09	181P352030	C-ELEC - 16V 47M-M	
C2W14	181P352030	C-ELEC - 16V 47M-M	
C3007	181P353020	C-ELEC - 25V 10M-M	
C3012	181P352030	C-ELEC - 16V 47M-M	
C3022	181P353020	C-ELEC - 25V 10M-M	
C3025	181P352030	C-ELEC - 16V 47M-M	
C3026	181P355030	C-ELEC - 50V 3.3M-M	
C3061	181P352030	C-ELEC - 16V 47M-M	
C3070	181P352030	C-ELEC - 16V 47M-M	
C3E01	181P354050	C-ELEC - 35V 47M-M	cdefgh
C3E01	181P354050	C-ELEC - 35V 47M-M	ab
C3E02	181P355010	C-ELEC - 50V 1M-M	
C3E03	172P331010	C-POLY - 50V 6800P-J	
C3E04	181P355010	C-ELEC - 50V 1M-M	
C3E05	172P331010	C-POLY - 50V 6800P-J	
C3E06	181P355050	C-ELEC - 50V 10M-M	
C3E07	181P353090	C-ELEC - 5V 2200M-M	
C3E09	172P262050	C-M-POLY - 50V 0.1M-J	
C3E11	172P262050	C-M-POLY - 50V 0.1M-J	
C3E12	172P262050	C-M-POLY - 50V 0.1M-J	
C3E14	172P262050	C-M-POLY - 50V 0.1M-J	
C3J08	181P352030	C-ELEC - 16V 47M-M	
C3J26	181P352030	C-ELEC - 16V 47M-M	
C3J38	181P355050	C-ELEC - 50V 10M-M	
C4B01	**172P261030**	**C-M-POLY - 50V 0.01M-J**	
C4B02	181P358000	C-ELEC - 35V 1000M-M	
C4B03	172P383030	C-M-POLY - 100V 0.47M-K	
C4B04	181P184020	C-ELEC - 35V 100M-M	
C4B06	172P330090	C-POLY - 50V 4700P-J	
C4B07	172P383030	C-M-POLY - 100V 0.47M-K	
C4B08	172P263070	C-M-POLY - 50V 1.0M-J	
C4B09	181P355060	C-ELEC - 50V 22M-M	
C4B10	181P354050	C-ELEC - 35V 47M-M	cdefgh
C4B10	181P354050	C-ELEC - 35V 47M-M	ab
C4B11	181P353090	C-ELEC - 5V 2200M-M	
C5A01	**181P355050**	**C-ELEC - 50V 10M-M**	
C5A02	**154P345090**	**C-CER-CHIP - CH25V 1000P-J**	
C5A03	**141P140090**	**C-CER-CHIP - B50V 1000P-K**	
C5A04	172P262010	C-M-POLY - 50V 0.047M-J	
C5A07	181P354050	C-ELEC - 35V 47M-M	
C5A09	181P355060	C-ELEC - 50V 22M-M	
C5A10	172P331070	C-POLY - 50V 0.022M-J	
C5A12	181P354090	C-ELEC - 35V 470M-M	
C5A14	172P434010	C-M-PLA-PP - 250V 0.047M-J	
C5A15	189D185010	C-ELEC - 160V 100M-M	
C5A21	172P262050	C-M-POLY - 50V 0.1M-J	ab
C5A22	181P355050	C-ELEC - 50V 10M-M	
C5A23	181P355050	C-ELEC - 50V 10M-M	
C5A31	172P571050	C-M-PLA-PP - 1500VHP 3900P-J-OR-H	ab
C5A31	172P571070	C-M-PLA-PP - 1500V 5600P-J	cdefgh
C5A32	172P571010	C-M-PLA-PP - 1500V 2700P-J	
C5A34	172P434010	C-M-PLA-PP - 250V 0.047M-J	
C5A36	172P436070	C-M-PLA-PP - 250V 0.56M-J	
C5A39	142P011030	C-CER - B500V 1000P-K	
C5A40	142P011000	C-CER - B500V 560P-K	
C5A41	181P352080	C-ELEC - 16V 1000M-M	
C5A42	181P354050	C-ELEC - 35V 47M-M	
C5A43	181P780030	C-ELEC - 160V 2.2M-M 105C	
C5A52	172P571030	C-M-PLA-PP - 1500V 3300P-J	
C5A53	185D120020	C-ELEC - H160V 470M-M 105C	
C5A55	172P082090	C-PLA-PP - 630V 8200P-J	
C5A56	181P354050	C-ELEC - 35V 47M-M	
C5A60	**172P262050**	**C-M-POLY - 50V 0.1M-J**	
C5A61	**181P355040**	**C-ELEC - 50V 4.7M-M**	
C5A64	181P355060	C-ELEC - 50V 22M-M	
C5A65	181P355050	C-ELEC - 50V 10M-M	
C5A68	181P123070	C-ELEC-NP - 50V 0.47M-M	

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
C5A70	**172P264010**	**C-M-POLY - 50V 2.2M-J**	
C5A71	**172P262050**	**C-M-POLY - 50V 0.1M-J**	
C5A72	181P355010	C-ELEC - 50V 1M-M	
C5H01	181P354080	C-ELEC - 35V 330M-M	
C5H16	172P186030	C-PLA-PP - 200V 0.01M-K	
C5H17	172P261030	C-M-POLY - 50V 0.01M-J	
C5H19	181P352040	C-ELEC - 16V 100M-M	
C5H20	181P352040	C-ELEC - 16V 100M-M	
C5H21	181P780060	C-ELEC - 160V 10M-M	
C5H24	181P192060	C-ELEC - 200V 22M-M/Q	
C5K00	172P572090	C-M-PLA-PP - 1500V 0.015M-J	
C5K01	172P572090	C-M-PLA-PP - 1500V 0.015M-J	
C5K03	142P024060	C-CER - BF50V 0.1M-Z	
C5K04	181P191000	C-ELEC - 160V 22M-M/Q	
C5K05	172P383030	C-M-POLY - 100V 0.47M-K	
C5K06	154P260080	C-CER - R1KV 3300P-K	
C5K07	172P261030	C-M-POLY - 50V 0.01M-J	
C5K08	155P239040	C-CER - CH50V 100P-J	
C5K09	172P262010	C-M-POLY - 50V 0.047M-J	
C5K10	181P354050	C-ELEC - 35V 47M-M	
C5K11	181P355050	C-ELEC - 50V 10M-M	
C5K12	172P262010	C-M-POLY - 50V 0.047M-J	
C5K13	154P270050	C-CER - SL1KV 22P-J	
C5K51	142P023080	C-CER - BF50V 0.01M-Z	
C6B02	181P195050	C-ELEC - 350V 10M-M/Q	
C6B03	155P231090	C-CER - CH50V 22P-J	
C6B04	142P023080	C-CER - BF50V 0.01M-Z	
C6B05	181P352080	C-ELEC - 16V 1000M-M	
C6B06	142P023080	C-CER - BF50V 0.01M-Z	
C6B07	172P532050	C-M-POLY - 400V 0.1M-J	
C6B08	142P020030	C-CER - B50V 330P-K	
C6B09	142P023080	C-CER - BF50V 0.01M-Z	
C6B10	172P532050	C-M-POLY - 400V 0.1M-J	
C6B11	154P400010	C-CER - B1KV 220P-K	
C6B12	155P231050	C-CER - CH50V 15P-J	
C6B13	155P231090	C-CER - CH50V 22P-J	
C6B14	154P405000	C-CER - B3KV 1000P-K	
C6G02	181P195050	C-ELEC - 350V 10M-M/Q	
C6G03	155P232010	C-CER - CH50V 27P-J	
C6G04	142P023080	C-CER - BF50V 0.01M-Z	
C6G05	181P352080	C-ELEC - 16V 1000M-M	
C6G06	142P023080	C-CER - BF50V 0.01M-Z	
C6G07	172P532050	C-M-POLY - 400V 0.1M-J	
C6G09	142P023080	C-CER - BF50V 0.01M-Z	
C6G10	172P532050	C-M-POLY - 400V 0.1M-J	
C6G11	154P400010	C-CER - B1KV 220P-K	
C6G12	155P231050	C-CER - CH50V 15P-J	
C6G13	155P231090	C-CER - CH50V 22P-J	
C6G14	154P405000	C-CER - B3KV 1000P-K	
C6G20	172P532050	C-M-POLY - 400V 0.1M-J	
C6R02	181P195050	C-ELEC - 350V 10M-M/Q	
C6R03	155P231090	C-CER - CH50V 22P-J	
C6R04	142P023080	C-CER - BF50V 0.01M-Z	
C6R05	181P352080	C-ELEC - 16V 1000M-M	
C6R06	142P023080	C-CER - BF50V 0.01M-Z	
C6R07	172P532050	C-M-POLY - 400V 0.1M-J	
C6R09	142P023080	C-CER - BF50V 0.01M-Z	
C6R10	172P532050	C-M-POLY - 400V 0.1M-J	
C6R11	154P400010	C-CER - B1KV 220P-K	
C6R12	155P231050	C-CER - CH50V 15P-J	
C6R13	155P231090	C-CER - CH50V 22P-J	
C6R14	154P405000	C-CER - B3KV 1000P-K	
C7A00	**154P345050**	**C-CER-CHIP - CH25V 680P-J**	
C7B02	181P355020	C-ELEC - 50V 2.2M-M	
C7B16	181P352030	C-ELEC - 16V 47M-M	
C7B88	181P355050	C-ELEC - 50V 10M-M	
C7B96	181P355020	C-ELEC - 50V 2.2M-M	
C7B99	181P352030	C-ELEC - 16V 47M-M	
C7DF3	181P350060	C-ELEC - 3V 1000M-M	
C7K01	181P352030	C-ELEC - 16V 47M-M	
C7K20	155P314040	C-CER - SL50V 220P-J	
C7K21	181P355050	C-ELEC - 50V 10M-M	
C7K23	181P355010	C-ELEC - 50V 1M-M	
C7K25	172P262050	C-M-POLY - 50V 0.1M-J	
C7K26	172P262050	C-M-POLY - 50V 0.1M-J	
C7K27	181P355010	C-ELEC - 50V 1M-M	
C7K28	181P352040	C-ELEC - 16V 100M-M	
C7K30	172P261030	C-M-POLY - 50V 0.01M-J	
C7M92	181P350040	C-ELEC - 6.3V 330M-M	
C7N06	181P350040	C-ELEC - 6.3V 330M-M	
C7P15	181P212060	C-ELEC - 16V 47M-M	
C7P19	181P352030	C-ELEC - 16V 47M-M	
C7P22	181P352050	C-ELEC - 16V 220M-M	
C7Q02	181P352040	C-ELEC - 16V 100M-M	
C7Q03	181P352030	C-ELEC - 16V 47M-M	
C7Q52	181P352040	C-ELEC - 16V 100M-M	
C7Q53	181P352030	C-ELEC - 16V 47M-M	
C7R08	181P355050	C-ELEC - 50V 10M-M	
C81A2	181P182030	C-ELEC - 16V 1000M-M 105C	
C81A3	181P182030	C-ELEC - 16V 1000M-M 105C	
C81B3	181P182030	C-ELEC - 16V 1000M-M 105C	
C81B4	181P182030	C-ELEC - 16V 1000M-M 105C	
C8281	189P197020	C-ELE-DBL-LA - FM0H473Z/EECS5R5T473Z	
C8705	181P185060	C-ELEC - 50V 10M-M 105C	
C8710	181P181000	C-ELEC - 10V 330M-M 105C	
C8717	181P352060	C-ELEC - 16V 330M-M	
C8719	181P732000	C-ELEC - 10V 680M-M 105C	
C8720	181P185060	C-ELEC - 50V 10M-M 105C	
C8725	181P182010	C-ELEC - 16V 330M-M 105C	
C8727	181P181000	C-ELEC - 10V 330M-M 105C	
C8729	181P732000	C-ELEC - 10V 680M-M 105C	
C8730	181P352060	C-ELEC - 16V 330M-M	
C8733	181P182010	C-ELEC - 16V 330M-M 105C	
C8751	181P355090	C-ELEC - 50V 100M-M	
C8761	181P352060	C-ELEC - 16V 330M-M	
C8764	181P352060	C-ELEC - 16V 330M-M	
C8771	181P353060	C-ELEC - 25V 330M-M	
C8772	181P732000	C-ELEC - 10V 680M-M 105C	
C8780	181P352060	C-ELEC - 16V 330M-M	
C8783	181P350040	C-ELEC - 6.3V 330M-M	
C8795	181P350040	C-ELEC - 6.3V 330M-M	
C8797	181P350040	C-ELEC - 6.3V 330M-M	
C8798	181P350040	C-ELEC - 6.3V 330M-M	
C8889	181P350040	C-ELEC - 6.3V 330M-M	
C8C03	181P358000	C-ELEC - 35V 1000M-M	
C8C05	181P358000	C-ELEC - 35V 1000M-M	
C8C18	181P358000	C-ELEC - 35V 1000M-M	

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
C8C20	181P358000	C-ELEC - 35V 1000M-M	
C8D12	181P352030	C-ELEC - 16V 47M-M	
C8D16	181P352030	C-ELEC - 16V 47M-M	
C8D20	181P352030	C-ELEC - 16V 47M-M	
C8D21	181P352030	C-ELEC - 16V 47M-M	
C8D22	181P352030	C-ELEC - 16V 47M-M	
C8D30	181P352030	C-ELEC - 16V 47M-M	
C8D31	181P352030	C-ELEC - 16V 47M-M	
C8D39	181P352030	C-ELEC - 16V 47M-M	
C8D40	181P352030	C-ELEC - 16V 47M-M	
C8E01	181P352030	C-ELEC - 16V 47M-M	
C8E03	181P352030	C-ELEC - 16V 47M-M	
C8E05	181P352030	C-ELEC - 16V 47M-M	
C8E07	181P352030	C-ELEC - 16V 47M-M	
C8E09	181P352030	C-ELEC - 16V 47M-M	
C8E12	181P352030	C-ELEC - 16V 47M-M	
C8E14	181P352030	C-ELEC - 16V 47M-M	
C8E16	181P352030	C-ELEC - 16V 47M-M	
C8G00	181P352030	C-ELEC - 16V 47M-M	
C8G01	181P352030	C-ELEC - 16V 47M-M	
C8G03	181P352020	C-ELEC - 16V 33M-M	
C8G05	181P352030	C-ELEC - 16V 47M-M	
C8G06	181P352030	C-ELEC - 16V 47M-M	
C9A01	181P352030	C-ELEC - 16V 47M-M	
C9A05	**189P185070**	**C-CER - AC250V E1000P-M**	
C9A06	**189P185070**	**C-CER - AC250V E1000P-M**	
C9A08	**189P185090**	**C-CER - AC250V E2200P-M**	
C9A09	**189P185090**	**C-CER - AC250V E2200P-M**	
C9A10	**189P185090**	**C-CER - AC250V E2200P-M**	
C9A11	**189P185090**	**C-CER - AC250V E2200P-M**	
C9A13	**189P152070**	**C-M-POLY - 250VAC 0.01M-M**	
C9A14	**189P152070**	**C-M-POLY - 250VAC 0.01M-M**	
C9A20	**154P400050**	**C-CER - B1KV 1000P-K**	
C9A21	**181P355050**	**C-ELEC - 50V 10M-M**	
C9A25	172P138010	C-POLY - 50V 4700P-J	
C9A26	185D122050	C-ELEC - H200V 1000M-M	
C9A29	181P355050	C-ELEC - 50V 10M-M	
C9A30	181P355050	C-ELEC - 50V 10M-M	
C9A32	181P735020	C-ELEC - 25V 1000M-M 105C	
C9A33	181P735020	C-ELEC - 25V 1000M-M 105C	
C9A34	154P400050	C-CER - B1KV 1000P-K	
C9A35	181P735010	C-ELEC - 25V 470M-M	
C9A37	181P734000	C-ELEC - 16V 2200M-M 105C	
C9A38	181P734000	C-ELEC - 16V 2200M-M 105C	
C9A41	181P732010	C-ELEC - 10V 1000M-M 105C	
C9A43	172P262050	C-M-POLY - 50V 0.1M-J	
C9A45	189P185090	C-CER - AC250V E2200P-M	
C9A50	**142P020050**	**C-CER - B50V 470P-K**	
C9A51	181P355090	C-ELEC - 50V 100M-M	
C9A52	154P260080	C-CER - R1KV 3300P-K	
C9A54	154P260080	C-CER - R1KV 3300P-K	
C9A56	181P355080	C-ELEC - 50V 47M-M	
C9A57	142P010090	C-CER - B500V 470P-K	
C9A58	185D122040	C-ELEC - H200V 820M-M	
C9A59	185D122040	C-ELEC - H200V 820M-M	
C9A60	154P400030	C-CER - B1KV 470P-K	
C9A61	142P010090	C-CER - B500V 470P-K	
C9A62	189D183010	C-ELEC - 400V 100M-KC	
C9A63	185D120020	C-ELEC - H160V 470M-M 105C	
C9A65	181P194000	C-ELEC - 250V 10M-M/Q	
C9A66	142P012050	C-CER - B500V 0.01M-K	
C9A68	142P010090	C-CER - B500V 470P-K	
C9A69	181P736070	C-ELEC - 35V 330M-M	
C9A72	181P736070	C-ELEC - 35V 330M-M	
C9A74	142P010090	C-CER - B500V 470P-K	
C9A75	181P355080	C-ELEC - 50V 47M-M	
C9A79	181P736070	C-ELEC - 35V 330M-M	
C9A80	181P736070	C-ELEC - 35V 330M-M	
C9A85	181P735020	C-ELEC - 25V 1000M-M 105C	
C9A86	181P735020	C-ELEC - 25V 1000M-M 105C	
C9C02	181P352040	C-ELEC - 16V 100M-M	
C9C03	181P743040	C-ELEC - 16V 330M-M	
C9C06	181P352040	C-ELEC - 16V 100M-M	
C9C07	181P743040	C-ELEC - 16V 330M-M	
C9C10	181P743040	C-ELEC - 16V 330M-M	
C9C13	181P352040	C-ELEC - 16V 100M-M	
C9C14	181P743040	C-ELEC - 16V 330M-M	
C9C16	181P352040	C-ELEC - 16V 100M-M	
C9C19	181P743040	C-ELEC - 16V 330M-M	
C9C22	181P352030	C-ELEC - 16V 47M-M	
C9C42	181P352040	C-ELEC - 16V 100M-M	
C9C44	181P352040	C-ELEC - 16V 100M-M	
C9C62	181P352030	C-ELEC - 16V 47M-M	
C9D00	**189P153040**	**C-M-POLY - 250VAC 0.1M-M**	
C9D02	**189P153040**	**C-M-POLY - 250VAC 0.1M-M**	
C9M01	181P352030	C-ELEC - 16V 47M-M	
C9M04	181P352030	C-ELEC - 16V 47M-M	
C9M05	181P212060	C-ELEC - 16V 47M-M	
C9M08	181P352030	C-ELEC - 16V 47M-M	

SWITCHES

S7L20	432P109010	SW-KEY BOARD - KSHS611BT	abdeg
S7L21	432P109010	SW-KEY BOARD - KSHS611BT	abdeg
S7L22	432P109010	SW-KEY BOARD - KSHS611BT	abdeg
S7L23	432P109010	SW-KEY BOARD - KSHS611BT	abdeg
S7L24	432P109010	SW-KEY BOARD - KSHS611BT	abdeg
S7L25	432P109010	SW-KEY BOARD - KSHS611BT	abdeg
S7L26	432P109010	SW-KEY BOARD - KSHS611BT	abdeg
S7L27	432P109010	SW-KEY BOARD - KSHS611BT	abdeg
S7L28	432P109010	SW-KEY BOARD - KSHS611BT	abdeg
S7L29	432P109010	SW-KEY BOARD - KSHS611BT	abdeg
S7L40	432P109010	SW-KEY BOARD - KSHS611BT	cfh
S7L41	432P109010	SW-KEY BOARD - KSHS611BT	cfh
S7L42	432P109010	SW-KEY BOARD - KSHS611BT	cfh
S7L43	432P109010	SW-KEY BOARD - KSHS611BT	cfh
S7L44	432P109010	SW-KEY BOARD - KSHS611BT	cfh
S7L45	432P109010	SW-KEY BOARD - KSHS611BT	cfh
S7L46	432P109010	SW-KEY BOARD - KSHS611BT	cfh
S7L47	432P109010	SW-KEY BOARD - KSHS611BT	cfh
S7L48	432P109010	SW-KEY BOARD - KSHS611BT	cfh
S7L49	432P109010	SW-KEY BOARD - KSHS611BT	cfh

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

MISCELLANEOUS

Ref #	Part #	Part Name & Description	[#]
	096Z465030	TAPE-LENS	bcdefh
	096Z465080	TAPE-LENS	ag
	242D535010	CABLE-EXTENSION - 1394	g
	242D535040	CABLE - 1394:300mm	cfh
	242D535050	CABLE - 1394:1000mm	cfh
	242D536010	CABLE-MEMORY - USB/5P-JS	dg
	242D540010	CABLE-IF - F-CONN 250mm	
	242D540020	CABLE-IF - PIN-PLUG 325mm	
	242D540030	CABLE-IF - PIN-PLUG 375mm	
	242D535020	CABLE - 1394:700mm	dg
	299P103060	FAN-COOLING	
	299P254020	IR-EMITTER, 4-HEAD - T-IR-02 W/FERRITE CO	
	299P271010	MEMORY-CARD-READER-PWB	dg
	305P703010	2RF-SWITCH	
	330P294010	**YOKE-DEFL - 840UH**	**ab**
	330P294020	**YOKE-DEFL - 720UH**	**cdefgh**
	338P054010	**SVM-ASSY**	**abe**
	338P054020	**SVM-ASSY**	**cdfgh**
	411D033010	CORE-FERRITE - R15 L18	
	411D044020	CORE-FERRITE - R19.5 L32	
	411D062010	CORE-FERRITE - R15 L18	abcefh
	411D063030	CORE-FERRITE - ZCAT2032-0930	
	411D064010	FERRITE CORE - HF57SH35X0.8	
	411D064020	FERRITE CORE - HF57SH28X0.7	
	453B036010	**CAP-ANODE - [R]**	**abcdef**
	453B036020	**CAP-ANODE - [GB]**	**abcdef**
	453B036070	**CAP-ANODE - [R]**	**gh**
	453B036080	**CAP-ANODE - [BG]**	**gh**
	480P053010	SPEAKER - 5"	a
	480P063010	SPEAKER - 6"	be
	480P066010	SPEAKER - 6"	cfh
	480P074010	SPEAKER - 5"x 7"	dg
	490P154010	**LENS-BARREL:RED**	**a**
	490P154020	**LENS-BARREL:BLUE/GREEN**	**a**
	490P172070	**LENS-BARREL:RED**	**e**
	490P172080	**LENS-BARREL:GREEN**	**e**
	490P172090	**LENS-BARREL:BLUE**	**e**
	490P205040	**LENS-BARREL:RED**	**cf**
	490P205050	**LENS-BARREL:GREEN**	**cf**
	490P205060	**LENS-BARREL:BLUE**	**cf**
	490P210040	**LENS-BARREL:RED**	**d**
	490P210050	**LENS-BARREL:GREEN**	**d**
	490P210060	**LENS-BARREL:BLUE**	**d**
	490P220010	**LENS-BARREL:BLUE**	**b**
	490P220040	**LENS-BARREL:RED/GREEN**	**b**
	490P226010	**LENS-BARREL:ALL**	**gh**
	598D456010	BRACKET-MIRROR - TOP	a
	598D651010	COVER - DM	
	589C063010	CASTOR - DUAL WHEEL	
	594C932010	SHEILD-CRT - TRAY	gh
	598D417020	PLATE-RF SWITCH	
	622B009020	TRAY - CRT-COOLANT	abcdefh
	622C086010	CLIP-MIRROR - TOP	a
	642C340010	BRACKET-MIRROR - TOP	ef
	642C352010	CLIP-MIRROR - TOP	bc
	669D633010	SCREW-LIQUID - M6*1.0-17.5	abcdef
	685D039010	SCREW-LIQUID	gh
	702A447011	ASSY-PANEL-TERMINAL	
	703D124010	CAP - SCREW GLOSSY BLACK	g
	703D125010	CAP - SCREW GRAY	efh
	703D125020	CAP - SCREW BLACK	ef
	750A449010	COVER-BACK - TOP	a
	761C725010	COVER-BTM - CARD READER	dg
	761C726010	COVER-TOP - CARD READER	dg
	767C031020	MIRROR - 73"	h
	767D048090	MIRROR - 65"	efg
	767D072030	MIRROR - 55"	c
	767D072040	MIRROR - 48"	a
	767D072060	MIRROR - 55"	d
	767D072050	MIRROR - 55"	b
	850C089020	INLAY DM	dg
	850C089010	INLAY DM	abcefh
	955C238003	ASSY-MEMORY CARD READER	dg
AG6B01	224D019090	AIR GAP - 1.5+-0.5KV	
AG6B02	224D019090	AIR GAP - 1.5+-0.5KV	
AG6G01	224D019090	AIR GAP - 1.5+-0.5KV	
AG6G02	224D019090	AIR GAP - 1.5+-0.5KV	
AG6R02	224D019090	AIR GAP - 1.5+-0.5KV	
AG6R01	224D019090	AIR GAP - 1.5+-0.5KV	
RV9D00	**265P100020**	**VAR - ERZV10D271CS**	
F5A00	**283P144070**	**FUSE - 125V 3A**	
F9A01	**283P144060**	**FUSE - 125V 7A**	
F9A02	**283P144090**	**FUSE - 125V 10A**	
F9A03	**283P144080**	**FUSE - 125V 5A**	
F9A04	**283P144080**	**FUSE - 125V 5A**	
F9A05	**283P144080**	**FUSE - 125V 5A**	
F9A21	**283P144090**	**FUSE - 125V 10A**	
F9A22	**283P144090**	**FUSE - 125V 10A**	
F9A23	**283P144070**	**FUSE - 125V 3A**	
F9D00	**283D131040**	**FUSE - S10A 125A**	
SF8800	296P171010	SAW-FILTER - X6892D	
SF8801	296P172010	SAW-FILTER - X7303P	
CF2N01	299P128010	OSC-CERAMIC - CSB500F2	
CF2P01	299P128010	OSC-CERAMIC - CSB500F2	
CF2V01	299P259010	OSC-CERAMIC - CSALA2M6964ZF01-B0	
T2830	409P961010	CHIP-FILTER - ACM2012D-9002P	
T2860	409P961010	CHIP-FILTER - ACM2012D-9002P	
T2910	409P961010	CHIP-FILTER - ACM2012D-9002P	
T2961	409P961010	CHIP-FILTER - ACM2012D-9002P	
J2J21	452C401010	CONNECTOR-USB	cdfgh
J2J22	451P246010	JACK-1394 - MINI	cdfgh
J8202	452C401010	CONNECTOR-USB	
J8301	440C393030	PIN-JACK-BOARD-1P	
J8402	451P246010	JACK-1394 - MINI	
J8403	451P246010	JACK-1394 - MINI	
K9A50	**287P111030**	**RELAY-POWER - LKS1AF-12V**	
PC9A21	**268P058020**	**PHOTO-COUPLER - ON3131-R/ON3161-R**	
PC9A50	**268P106010**	**PHOTO-COUPLER - CNZ3133**	
PJ2J00	440C407010	PIN-JACK-BOARD-6P	
PJ2J01	440C412020	PIN-JACK-BOARD-3P-1S	
PJ2J02	440C421010	PIN-JACK-BOARD-2P	
PJ2J03	440C410010	PIN-JACK-BOARD-5P	
PJ2J04	440C410010	PIN-JACK-BOARD-5P	

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
PJ2J05	440C421010	PIN-JACK-BOARD-2P	
PJ2J06	451C259010	JACK-MICROPHONE	
PJ2J07	451C259010	JACK-MICROPHONE	
PJ2J11	440C412010	PIN-JACK-BOARD-3P	
SKT6B1	**449C141030**	**SOCKET-CRT**	
SKT6R1	**449C141030**	**SOCKET-CRT**	
SKT6G1	**449C141030**	**SOCKET-CRT**	
TU8700	**295P490040**	**TUNER-TV - ENA46914P4A**	
TU8701	**295P523010**	**TUNER-NTSC/ATSC**	
TU8702	**295P524010**	**TUNER-OOB**	
TU8704	**295P527010**	**TUNER-NTSC DEMODULATOR**	
X2K51	285P426020	QTZ-CRYST - 4.000000MHZ	
X2M47	285P426040	QTZ-CRYST - 20.000MHZ	
X2N26	285P426010	QTZ-CRYST - 3.579545MHZ	
X2P26	285P426010	QTZ-CRYST - 3.579545MHZ	
X3001	285P413010	QTZ-CRYST - 18.432MHZ	
X7A13	285P434020	QTZ-CRYST - 16.000MHZ	
X7J10	285P335050	QTZ-CRYST - 80.000MHZ	
X7P09	285P434010	QTZ-CRYST - 8.000MHZ	
X8001	285P441040	QTZ-CRYST - 26.1621MHZ	
X8301	285P434020	QTZ-CRYST - 16.000MHZ	
X8302	285P441030	QTZ-CRYST - 14.31818MHZ	dg
X8303	285P413030	QTZ-CRYST - 18.432MHZ	
X8401	285P431020	QTZ-CRYST - 54.000MHZ	
X8402	285P410020	QTZ-CRYST - 24.576MHZ	
X8800	285P410080	QTZ-CRYST - 25.14MHZ	
Z7K01	**939P617010**	**UNIT-PREAMP - GP1U283Q**	
Z81A1	**283P128050**	**FUSE-CHIP - AC125/100V 4A**	
Z81A2	**283P128050**	**FUSE-CHIP - AC125/100V 4A**	
Z81A3	**283P128050**	**FUSE-CHIP - AC125/100V 4A**	
Z81A4	**283P128050**	**FUSE-CHIP - AC125/100V 4A**	

PRINTED CIRCUIT BOARDS

	930B918001	ASSY-PWB-MAIN	ab
	930B918002	ASSY-PWB-MAIN	cdef
	930B918003	ASSY-PWB-MAIN	gh
	930B919001-48	ASSY-PWB-SIGNAL	a
	930B919001-55	ASSY-PWB-SIGNAL	b
	930B919002-55	ASSY-PWB-SIGNAL	c
	930B919002-65	ASSY-PWB-SIGNAL	ef
	930B919003	ASSY-PWB-SIGNAL	h
	930B919006	ASSY-PWB-SIGNAL	d
	930B919007	ASSY-PWB-SIGNAL	g
	930B920001	ASSY-PWB-TERMINAL	abcefh
	930B920002	ASSY-PWB-TERMINAL	dg
	934C106001	ASSY-PWB-CRT	
	934C107001	ASSY-PWB-HDMI	
	934C108001	ASSY-PWB-DM3	abe
	934C108002	ASSY-PWB-DM3	dg
	934C108003	ASSY-PWB-DM3	cfh
	934C109001-48	ASSY-PWB-E2P	a
	934C109001-55	ASSY-PWB-E2P	bcd
	934C109001-65	ASSY-PWB-E2P	efg
	934C109001-73	ASSY-PWB-E2P	h
	934C110001	ASSY-PWB-TUNER	
	935D762001	ASSY-PWB-PREAMP	
	935D763001	ASSY-PWB-FRONT	abcefh
	935D763002	ASSY-PWB-FRONT	dg
	935D764001	ASSY-PWB-CONTROL	abdeg
	935D767001	ASSY-PWB-DBF	
	935D770001	ASSY-PWB-FIF	cdfgh
	935D772001	ASSY-PWB-CONTROL	cfh

COSMETIC PARTS

	703B038010	DOOR - A/V	abcef
	703B044010	PANEL-CARD READER - FRONT	dg
	716C040A20	BADGE-BRAND - GOLD	cfh
	716C040010	BADGE-BRAND - SILVER	abe
	716C041010	BADGE-BRAND - ALUMINUM	dg
	720C188050	COVER-FRONT	ag
	720C250020	COVER-FRONT	ef
	720C254010	COVER-FRONT	bc
	720C257020	COVER-FRONT	d
	761A209030	GRILLE - SPEAKER	a
	761A210010	GRILLE - SPEAKER	b
	761A211010	GRILLE - SPEAKER	e
	761A224010	GRILLE SPEAKER	c
	761A225010	GRILLE SPEAKER	f
	761A226010	GRILLE SPEAKER	h
	761A199020	GRILLE-SPEAKER - 65"	g
	761A223010	GRILLE-SPEAKER - 55"	d
	762B375020	PANEL-FRONT - WOOD	g
	762B384010	PANEL-FRONT - WOOD	d
	775B140010	NAME-PLATE - WS-55515	b
	775B140060	NAME-PLATE - WS-48515	a
	775B140070	NAME-PLATE - WS-65515	e
	775B140080	NAME-PLATE - WS-55615	c
	775B140090	NAME-PLATE - WS-65615	f
	775B141010	NAME-PLATE - WS-73615	h
	775B141020	NAME-PLATE - WS-55815	d
	775B141030	NAME-PLATE - WS-65815	g

ACCESSORIES

	242D525010	CABLE - AUDIO	
	242D527010	**CABLE - IR**	**dg**
	246C351030	CORD-AC - POWER	
	290P122010	REMOTE-CONTROL - V25/V25+	abcefh
	290P123010	REMOTE-CONTROL - V25++	dg
	I/QR WS48515	GUIDE - QUICK REF:V25/V25+	abcefh
	I/QR WS55815	GUIDE - QUICK REF:V25++	dg
	I/B WS48515	GUIDE - OWNERS:V25/V25+	abcefh
	I/B WS55815	GUIDE - OWNERS:V25++	dg

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
		WS-48515	
		(Figure 1)	
(1)	491P138030	SCREEN-LENTICULAR - 48"	a
(2)	491P139020	LENS-FRESNEL - 48"	a
(3)	597C027010	BRACKET-SCREEN FRAME	a
(4)	598D339010	BRACKET-SCREEN-SIDE	a
(5)	622B010010	HOLDER-SCREEN - TOP	a
(6)	622B011010	HOLDER-SCREEN - BOTTOM	a
(7)	622B012010	HOLDER-SCREEN - SIDE	a
(8)	622B013030	CLIP-DIAMOND SHIELD - 48"	a
(9)	635B109010	STIFFENER-SCREEN - TOP	a
(10)	751A005080	BEZEL-FRONT 48"	a
(11)	760D628090	DIAMOND SHIELD-48"	a

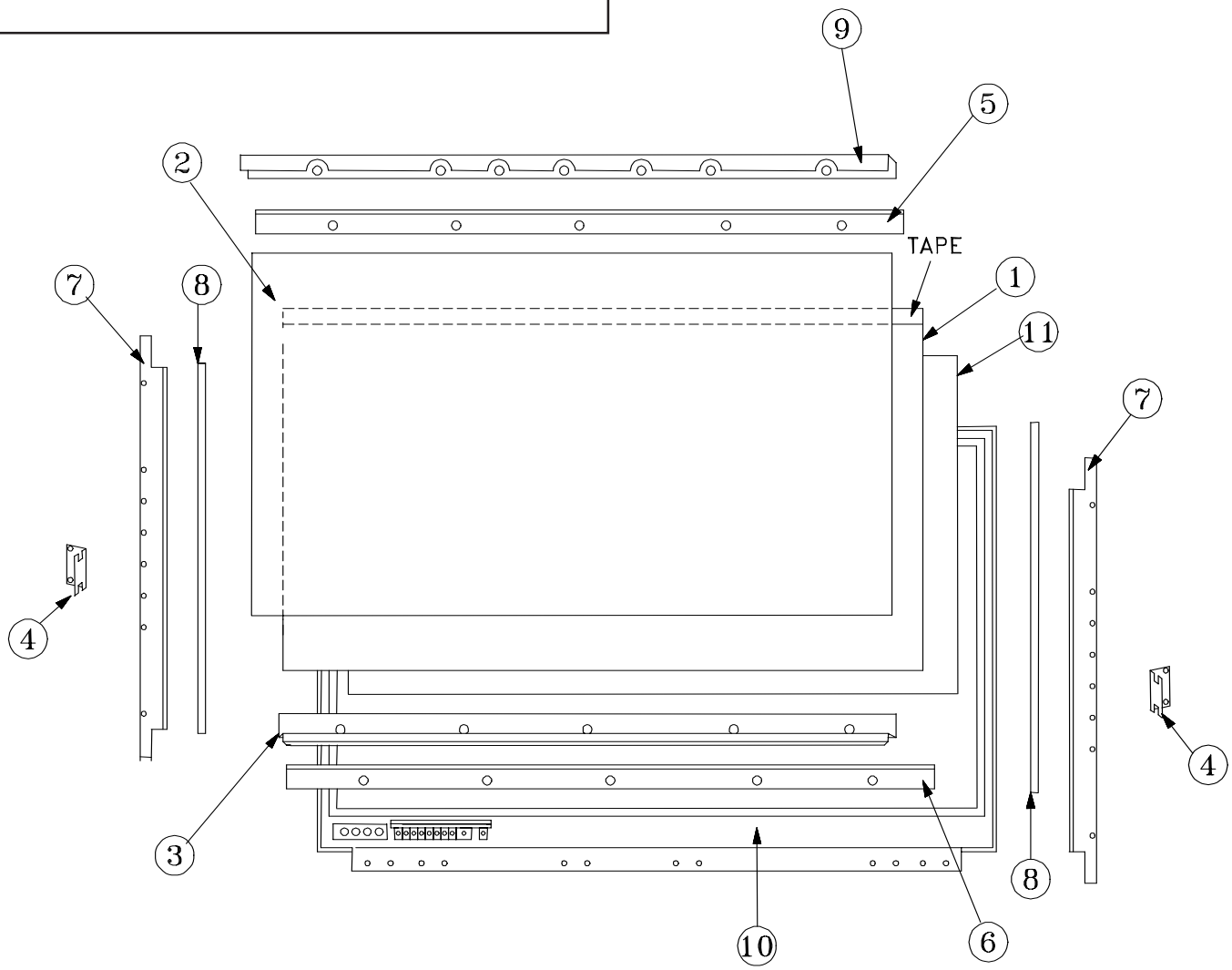


Figure 1: WS-48515

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

WS-55515 (Figure 2)

Ref #	Part #	Part Name & Description	[#]
(1)	491P180010	SCREEN-LENTICULAR - 55"	b
(2)	491P181010	LENS-FRESNEL - 55"	b
(3)	622B016010	CLIP-DIAMOND SHIELD - 55"	b
(4)	622C104010	HOLDER-SCREEN	b
(5)	701B481010	FRAME-SCREEN-TOP	b
(6)	701B482010	FRAME-SCREEN-SIDE	b
(7)	702A446010	CAP-CORNER - TOP	b
(8)	702A436050	PANEL-CONTROL - BTM FRAME	b
(9)	760D628080	DIAMOND SHIELD - 55"	b
(11)	598D491010	BRACKET-SCREEN SIDE	b

WS-65515 (Figure 2)

Ref #	Part #	Part Name & Description	[#]
(1)	491P182010	SCREEN-LENTICULAR - 65"	e
(2)	491P183010	LENS-FRESNEL - 65"	e
(3)	622B016020	CLIP-DIAMOND SHIELD - 65"	e
(4)	622C104020	HOLDER-SCREEN	e
(5)	701B481020	FRAME-SCREEN-TOP	e
(6)	701B482020	FRAME-SCREEN-SIDE	e
(7)	702A446010	CAP-CORNER - TOP	e
(8)	702A437050	PANEL-CONTROL - BTM FRAME	e
(9)	760D627070	DIAMOND SHIELD - 65"	e
(10)	594C988010	BRACKET-SCREEN FRAME	efh
(11)	598D491010	BRACKET-SCREEN SIDE	e

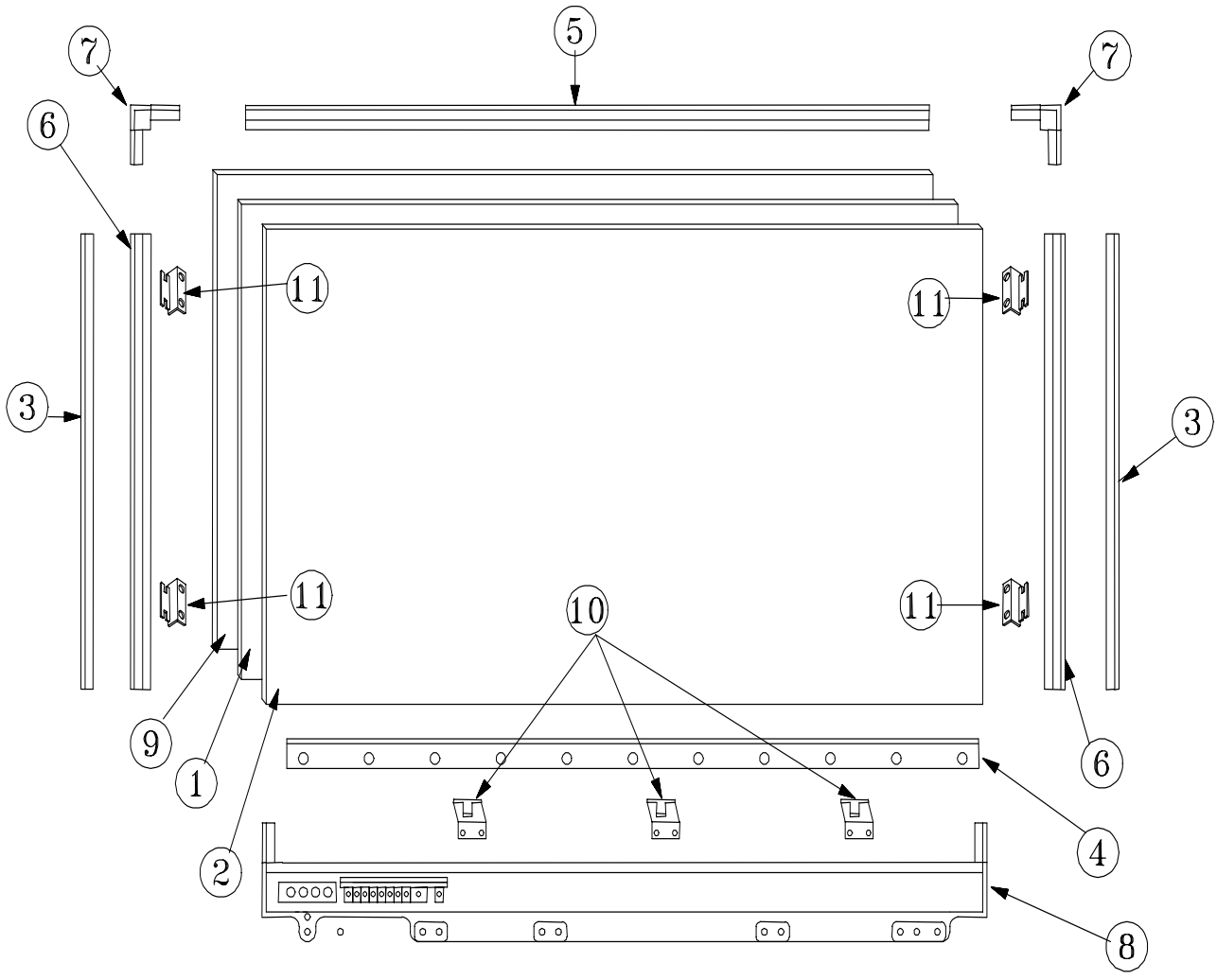


Figure 2: WS-55515 / WS-65515

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
		WS-55815 (Figure 3)	
(1)	491P180010	SCREEN-LENTICULAR - 55"	d
(2)	491P181010	SCREEN-FRESNEL - 55"	d
(3)	622C090020	CLIP-DIAMOND SHIELD - 55"	d
(4)	702A408010	CAP-CORNER - TOP	dg
(6)	702A409020	CAP-CORNER-BOTTOM - LEFT	dg
(7)	760D646010	DIAMOND SHIELD - 55" AR	d
(8)	701B466020	FRAME-SCREEN-SIDE	d
(9)	701B467020	FRAME-SCREEN-TOP	d
(10)	701B468050	FRAME-SCREEN-BTM	d
(11)	702A409010	CAP-CORNER-BOTTOM - RIGHT	dg

Ref #	Part #	Part Name & Description	[#]
		WS-65815 (Figure 3)	
(1)	491P182020	SCREEN-LENTICULAR - 65"	g
(2)	491P183020	SCREEN-FRESNEL - 65"	g
(3)	622C090010	CLIP-DIAMOND SHIELD - 65"	g
(4)	702A408010	CAP-CORNER - TOP	dg
(6)	702A409020	CAP-CORNER-BOTTOM - LEFT	dg
(7)	760D644020	DIAMOND SHIELD - 65" AR	g
(8)	701B466030	FRAME-SCREEN-SIDE	g
(9)	701B467030	FRAME-SCREEN-TOP	g
(10)	701B468040	FRAME-SCREEN-BTM	g
(11)	702A409010	CAP-CORNER-BOTTOM - RIGHT	dg

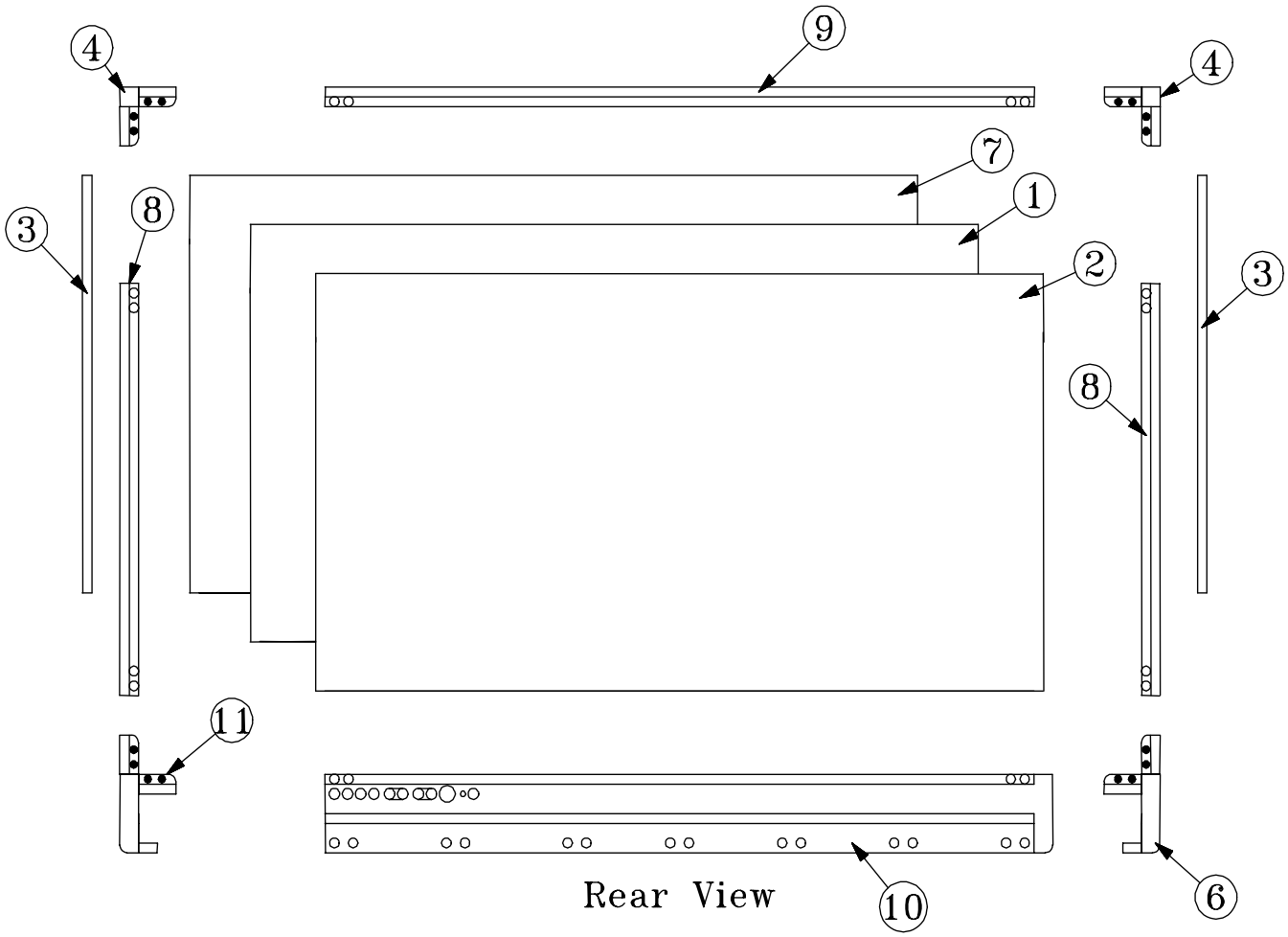


Figure 3: WS-55815 / WS-65815

[#] Model Legend:
(a) WS-48515, (b) WS-55515, (c) WS-55615, (d) WS-55815, (e) WS-65515, (f) WS-65615, (g) WS-65815, (h) WS-73615

Ref #	Part #	Part Name & Description	[#]
		WS-55615 (Figure 4)	
(1)	491P181010	LENS-FRESNEL	bcd
(2)	491P180010	SCREEN-LENTICULAR	bcd
(3)	702A449010	FRAME SCREEN TOP	c
(4)	701B498010	FRAME SCREEN SIDE	c
(5)	598D619010	BRACKET SCREEN SIDE	cfh
(6)	635B113010	FRAME TOP - SUPPORT	c
(7)	760D628080	DIAMOND - SHIELD	bc
(8)	622C104030	HOLDER SCREEN	c
(9)	702A550010	CONTROL PANEL	c
		WS-65615 (Figure 4)	
(1)	491P183010	LENS-FRESNEL	ef
(2)	491P182010	SCREEN-LENTICULAR	ef
(3)	702A453010	FRAME SCREEN TOP	f
(4)	701B498020	FRAME SCREEN SIDE	f
(5)	598D619010	BRACKET SCREEN SIDE	cfh
(6)	635B113020	FRAME TOP - SUPPORT	efh
(7)	760D627070	DIAMOND SHIELD	f
(8)	622C104040	HOLDER SCREEN	ef
(9)	702A452010	CONTROL PANEL	f
(10)	594C988010	BRACKET - FRAME	efh
		WS-73615 (Figure 4)	
(1)	491P186010	LENS-FRESNEL	h
(2)	491P185010	SCREEN-LENTICULAR	h
(3)	702A454010	FRAME SCREEN TOP	h
(4)	701B498030	FRAME SCREEN SIDE	h
(5)	598D619010	BRACKET SCREEN SIDE	cfh
(6)	635B113030	FRAME TOP - SUPPORT	efh
(7)	760D638010	DIAMOND SHIELD - 73"	h
(8)	622C214010	HOLDER SCREEN	h
(9)	702A450010	CONTROL PANEL	h
(10)	594C988010	BRACKET - FRAME	efh

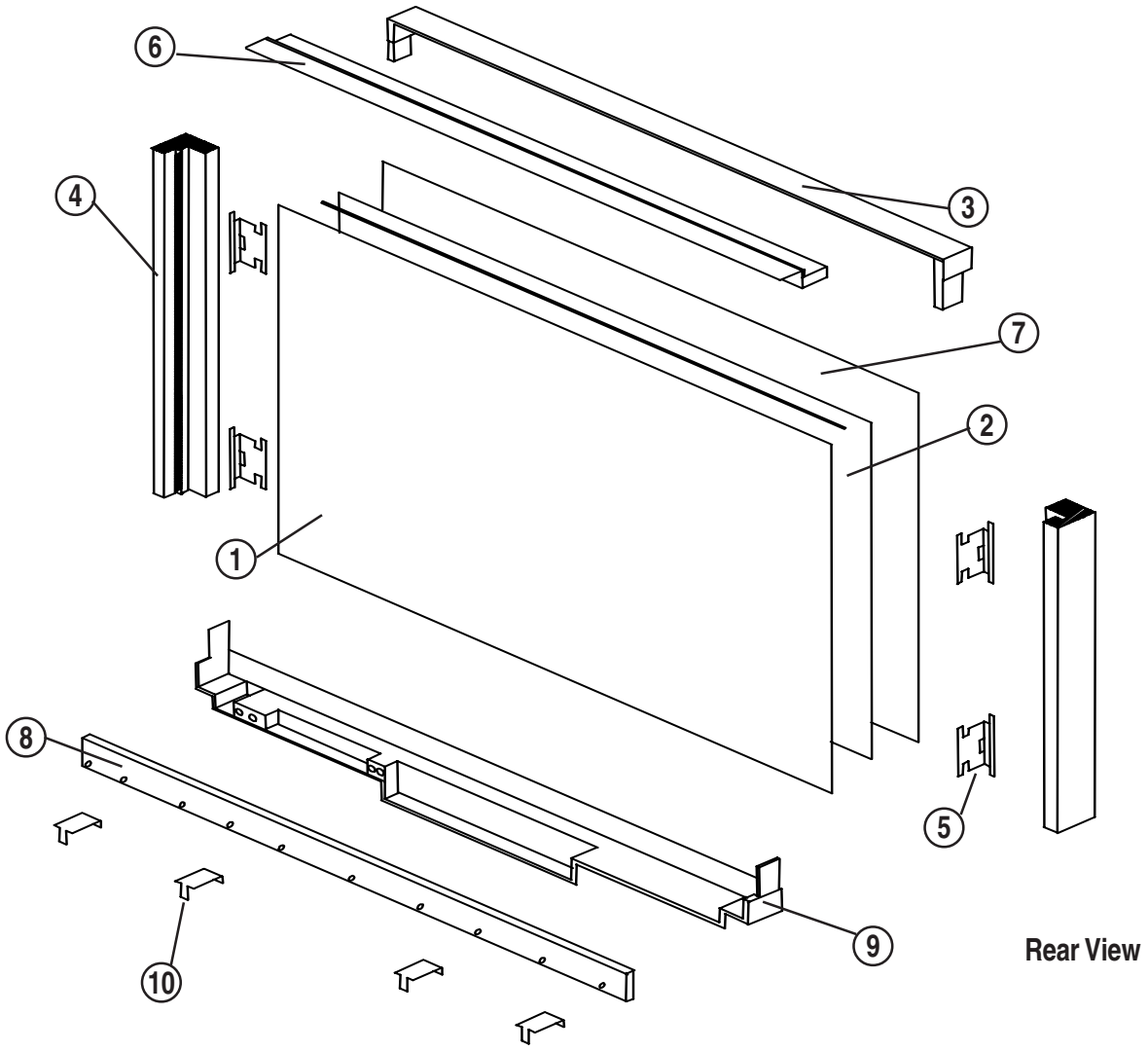
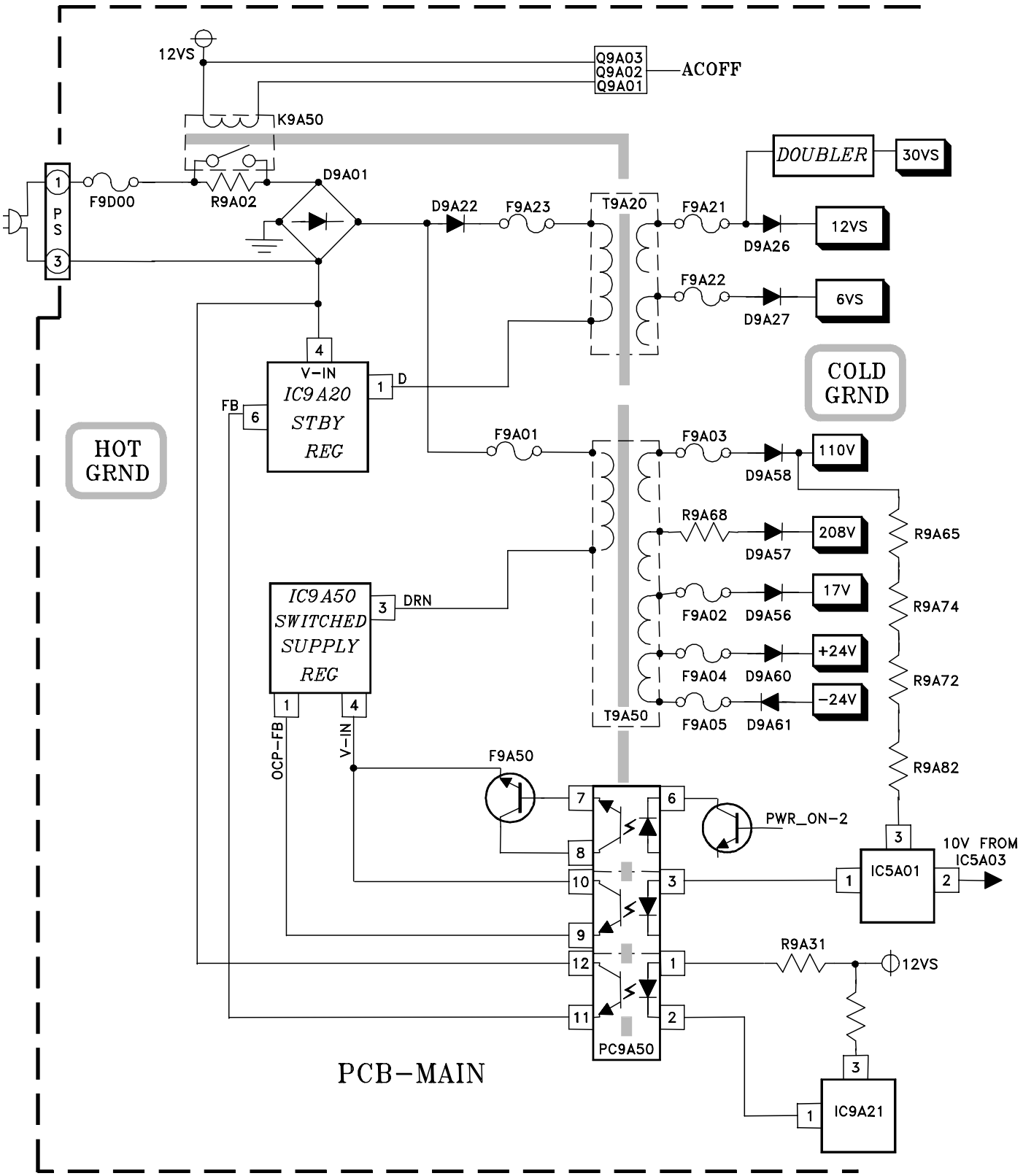
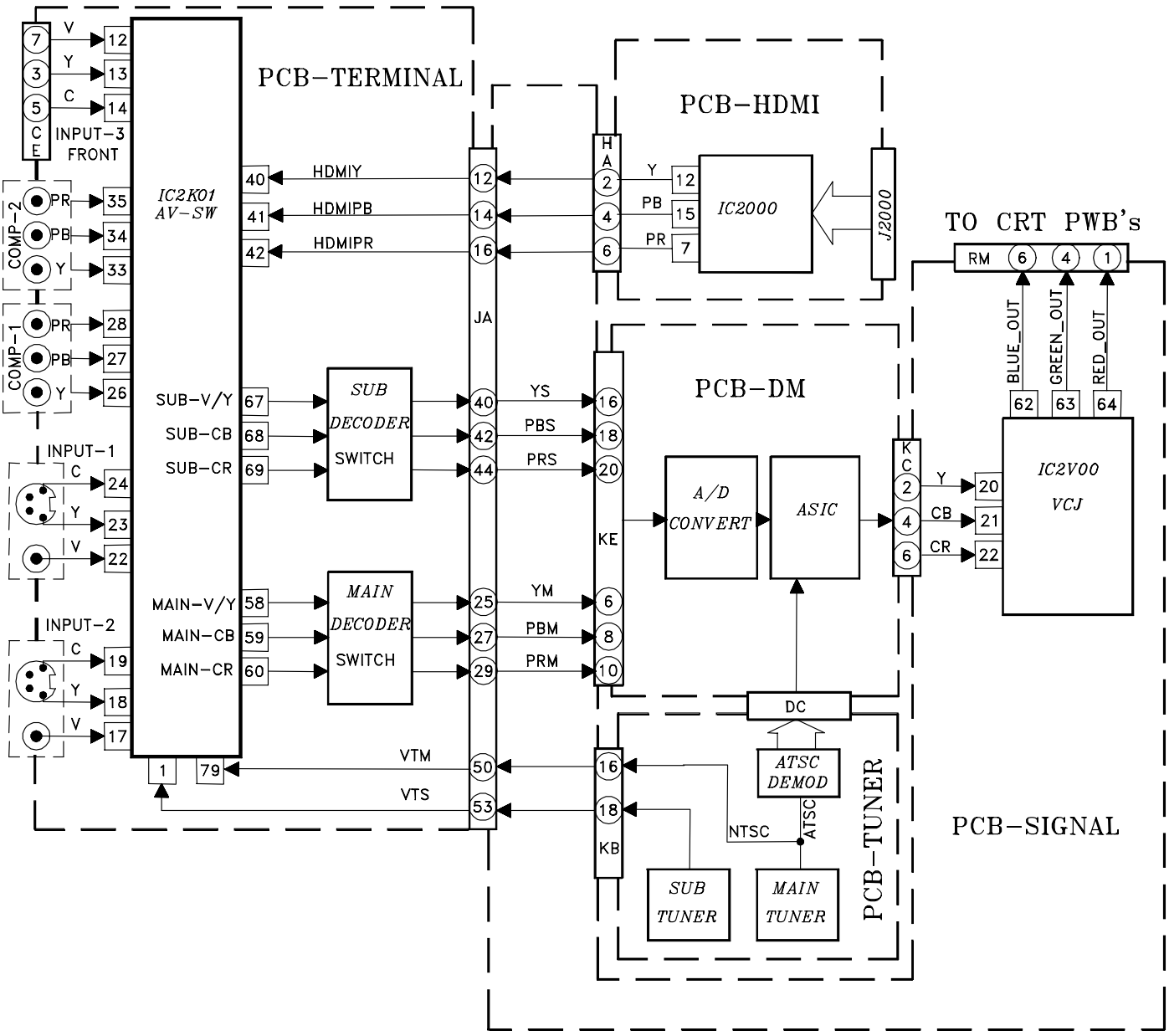


Figure 4: WS-55615 / WS-65615 / WS-73615

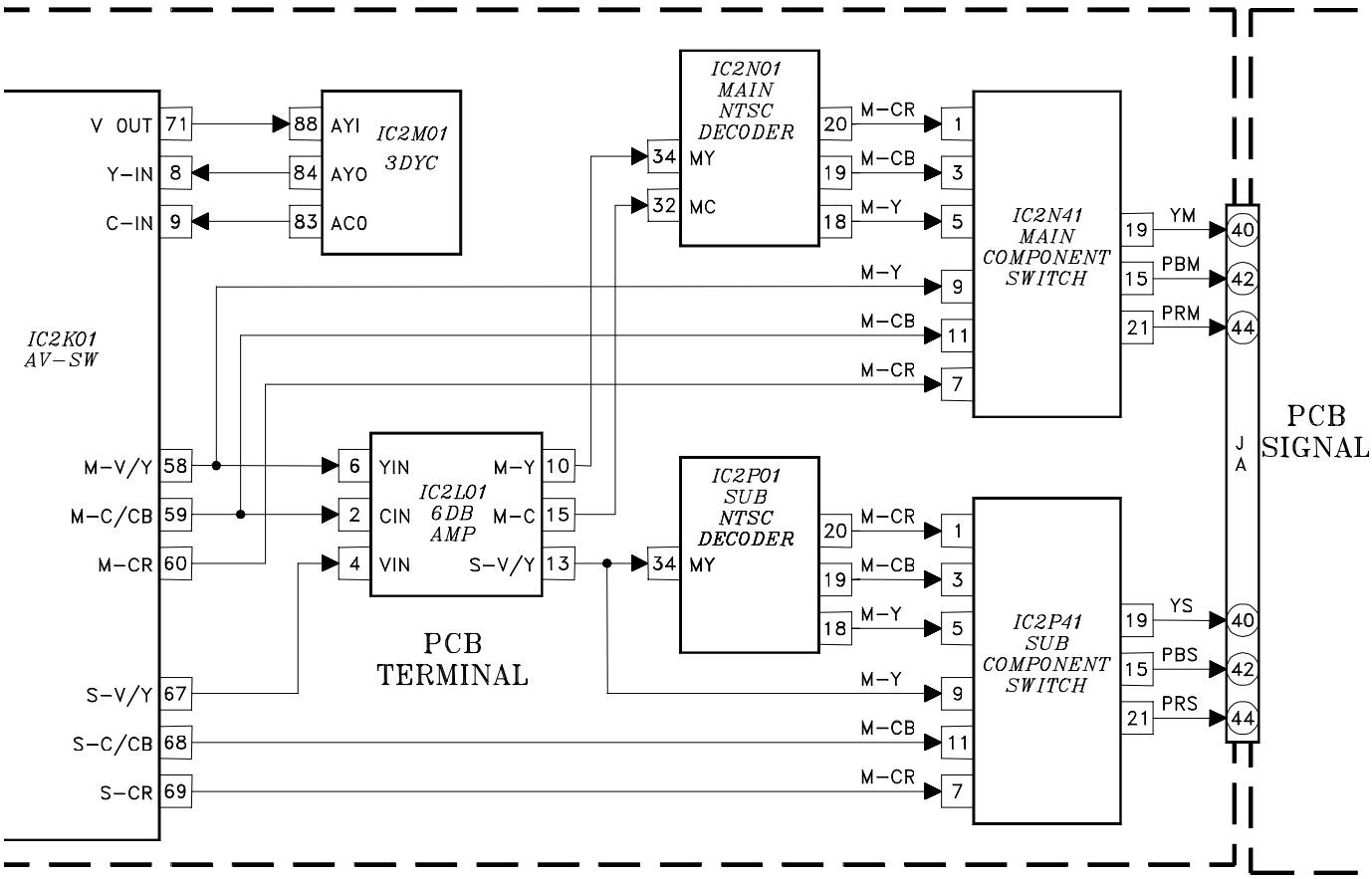
POWER SUPPLY



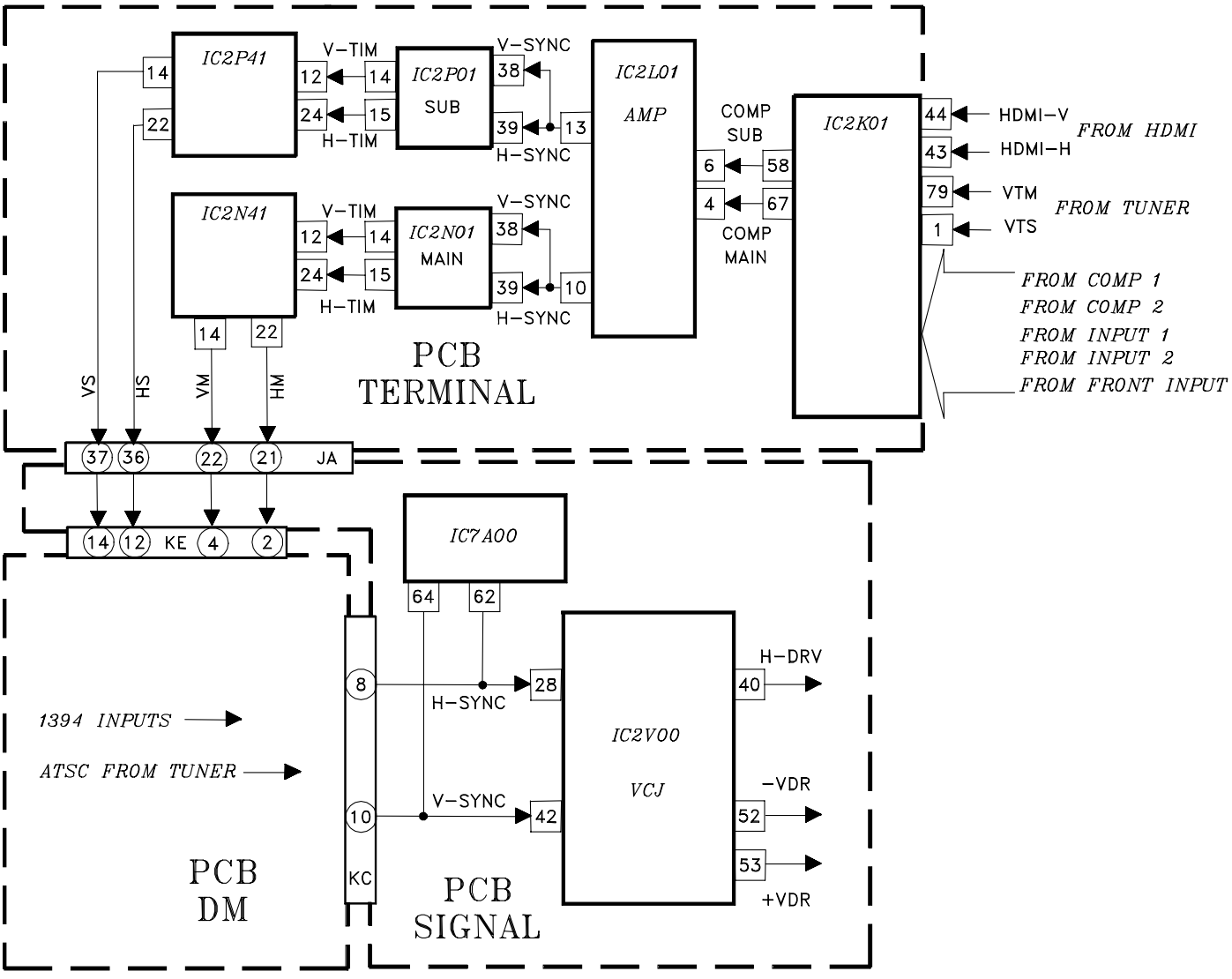
VIDEO SIGNAL PATH



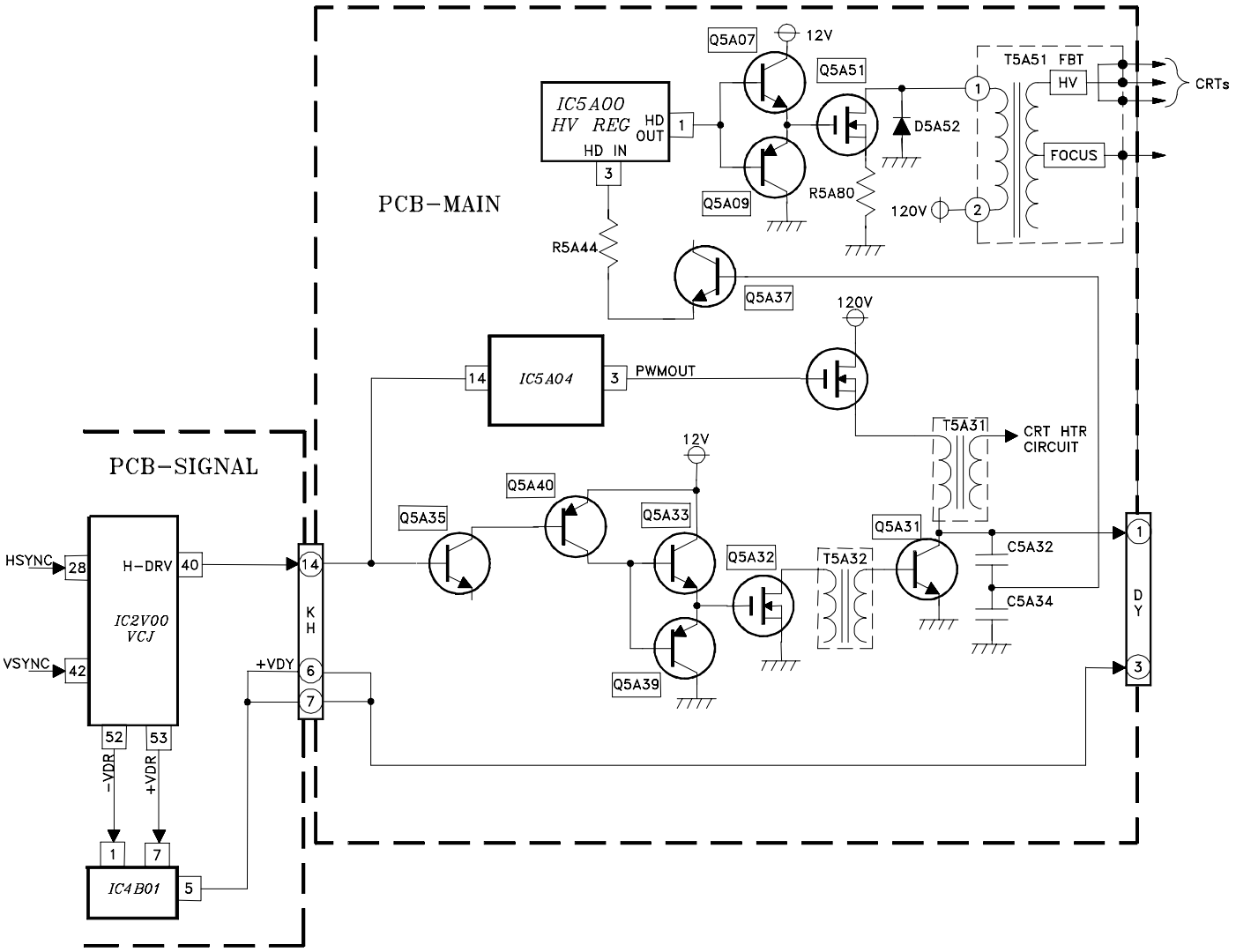
A/V SWITCH


IC2K01
AV-SW
V OUT 71
Y-IN 8
C-IN 9
88 AYI
84 AYO
83 AC0
IC2M01
3DYC
IC2N01
MAIN
NTSC
DECODER
34 MY
32 MC
20 M-CR
19 M-CB
18 M-Y
IC2N41
MAIN
COMPONENT
SWITCH
19 YM
15 PBM
21 PRM
M-Y 9
M-CB 11
M-CR 7
M-V/Y 58
M-C/CB 59
M-CR 60
6 YIN
2 CIN
4 VIN
M-Y 10
M-C 15
S-V/Y 13
IC2L01
6DB
AMP
PCB
TERMINAL
IC2P01
SUB
NTSC
DECODER
IC2P41
SUB
COMPONENT
SWITCH
YS
PBS
PRS
S-V/Y 67
S-C/CB 68
S-CR 69
J
A
40
42
44
PCB
SIGNAL

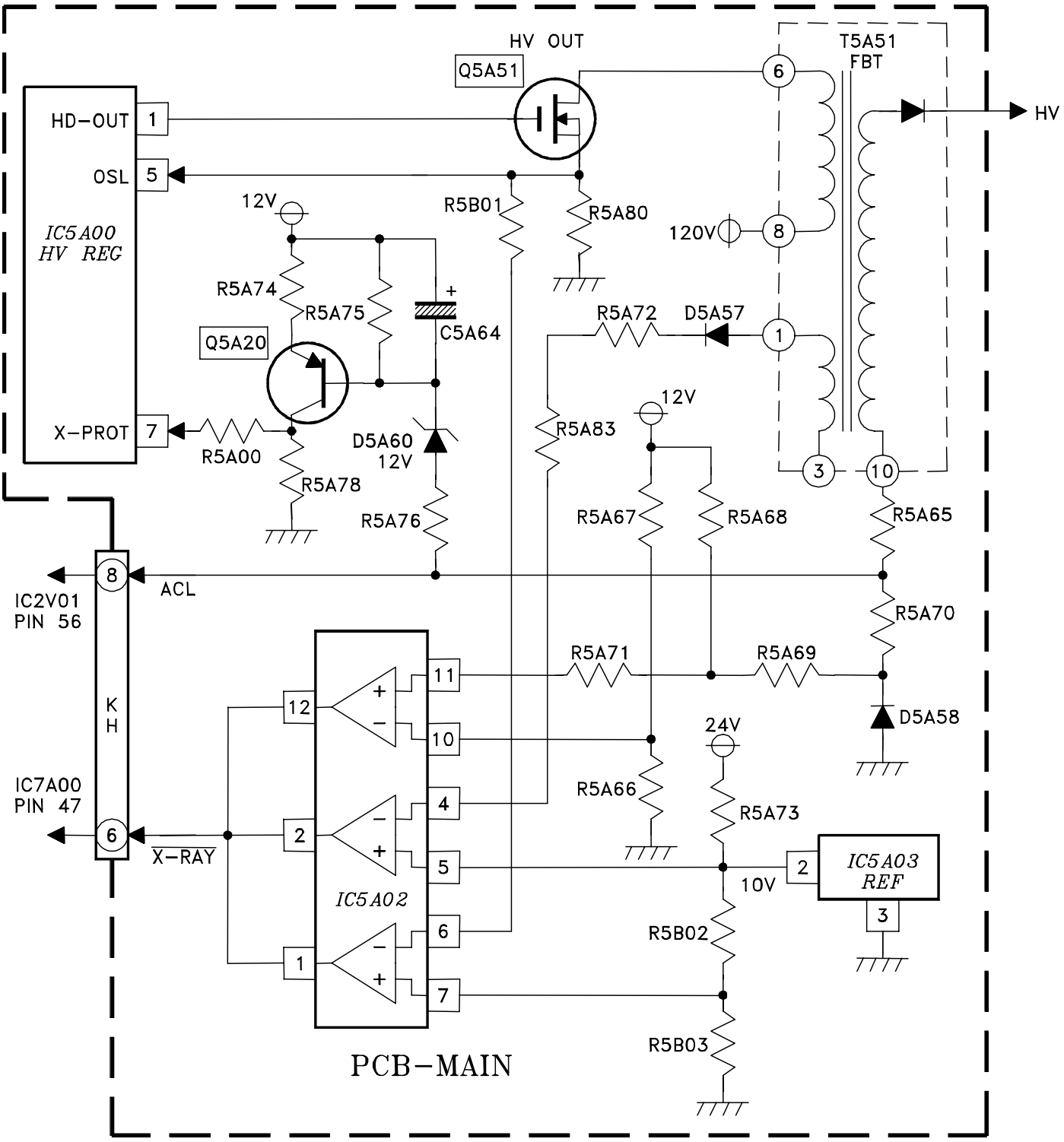
SYNC PATH


IC2P41
IC2P01
SUB
IC2N41
IC2N01
MAIN
V-TIM
H-TIM
V-SYNC
H-SYNC
IC2L01
AMP
COMP
SUB
COMP
MAIN
IC2K01
HDMI-V
HDMI-H
FROM HDMI
VTM
VTS
FROM TUNER
FROM COMP 1
FROM COMP 2
FROM INPUT 1
FROM INPUT 2
FROM FRONT INPUT
VS
HS
VM
HM
PCB
TERMINAL
JA
KE
IC7A00
1394 INPUTS
ATSC FROM TUNER
H-SYNC
V-SYNC
IC2V00
VCJ
H-DRV
-VDR
+VDR
KC
PCB
DM
PCB
SIGNAL

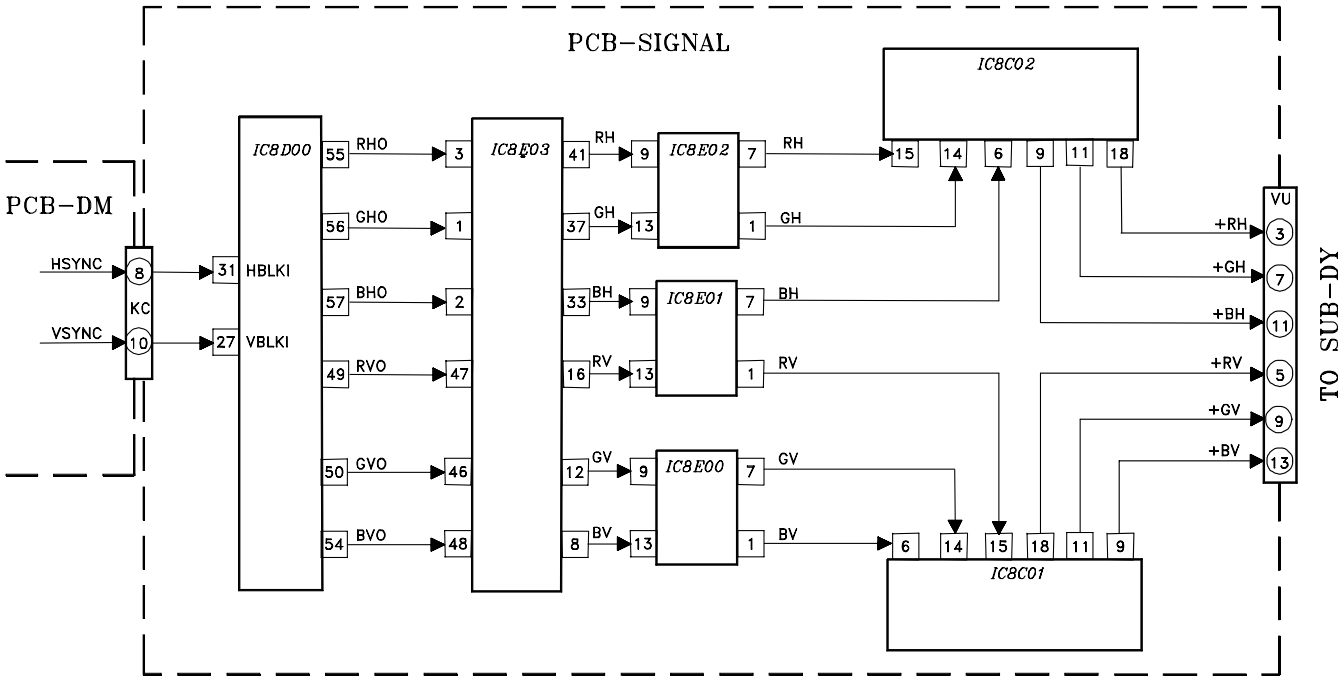
DEFLECTION / HV



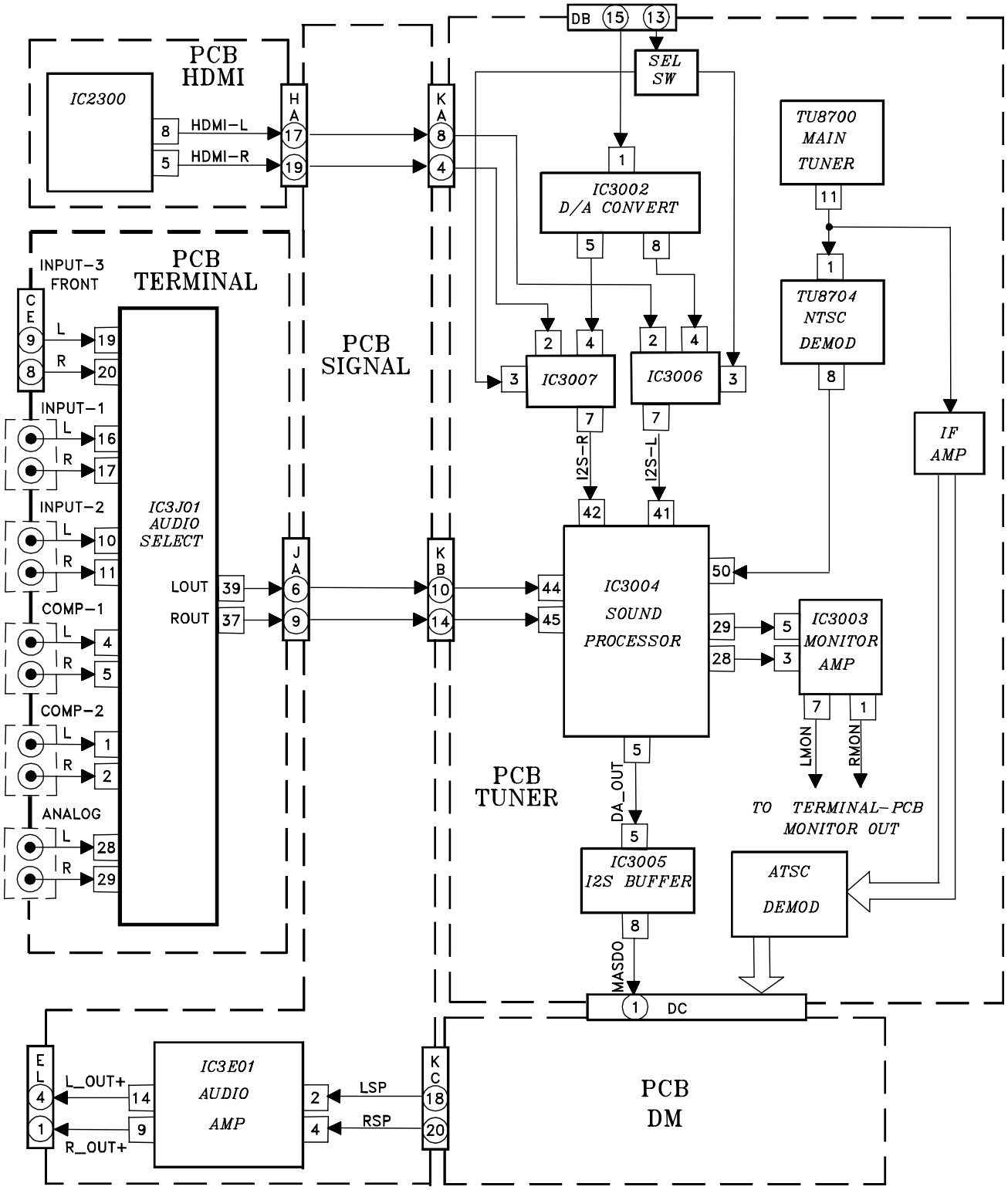
X-RAY PROTECT



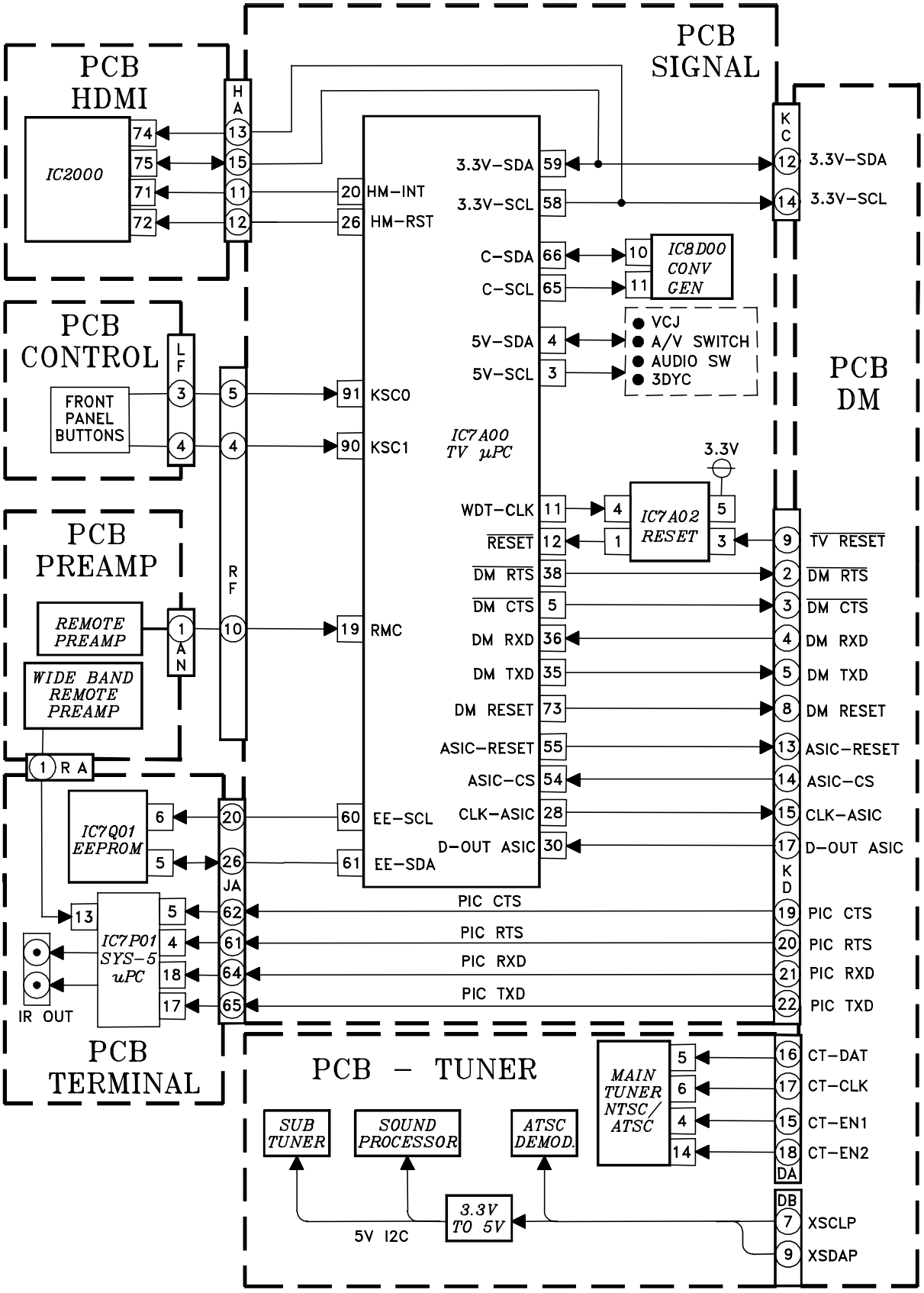
CONVERGENCE CIRCUIT



SOUND CIRCUIT



CONTROL CIRCUITRY



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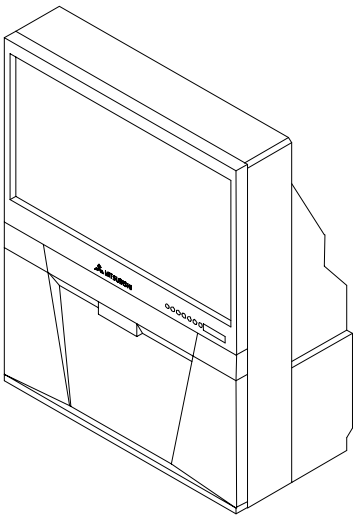
Service Manual



WS-48515

PROJECTION TELEVISION
V25 / V25+ / V25++ / V27 CHASSIS

V25 MODELS	V25+ MODELS
WS-48515	WS-55615
WS-55515	WS-65615
WS-65515	WS-73615

V25++ MODELS	V27 MODELS
WS-55815	WS-55517
WS-65815	WS-65517
	WS-73517

CAUTION:
Before servicing this chassis, it is important that the service person read the "SAFETY PRECAUTIONS" and "PRODUCT SAFETY NOTICE" contained in Part 1 of this manual.

PART 2
SCHEMATIC DIAGRAMS

CONTENTS **Page**

Overall PCB Block Diagram 1
PCB-MAIN 2
PCB-TERMINAL [INPUT SWITCH] 3
PCB-TERIMINAL [PIC μP / FIF / E2P] 4
PCBs-CRT / DBF / PREAMP /CONTROL1 / CONTROL2 / FRONT 5
PCB-HDMI 6
PCB-SIGNAL-1 [MICRO] 7
PCB-SIGNAL-2 [CONVERGENCE GENERATOR] 8
PCB-SIGNAL-3 [VCJ / VERTICAL DEF / AUDIO] 9
PCB-TUNER-1 [TUNER / AUDIO] 10
PCB-TUNER-2 [ATSC DEMOD] 11

Refer to PART 1 for:
- Specifications
- Safety Precautions
- Disassembly
- CRT Replacement
- Electrical Adjustments
- Parts List
- Block Diagrams

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9351 Jeronimo Road, Irvine, CA 92618-1904

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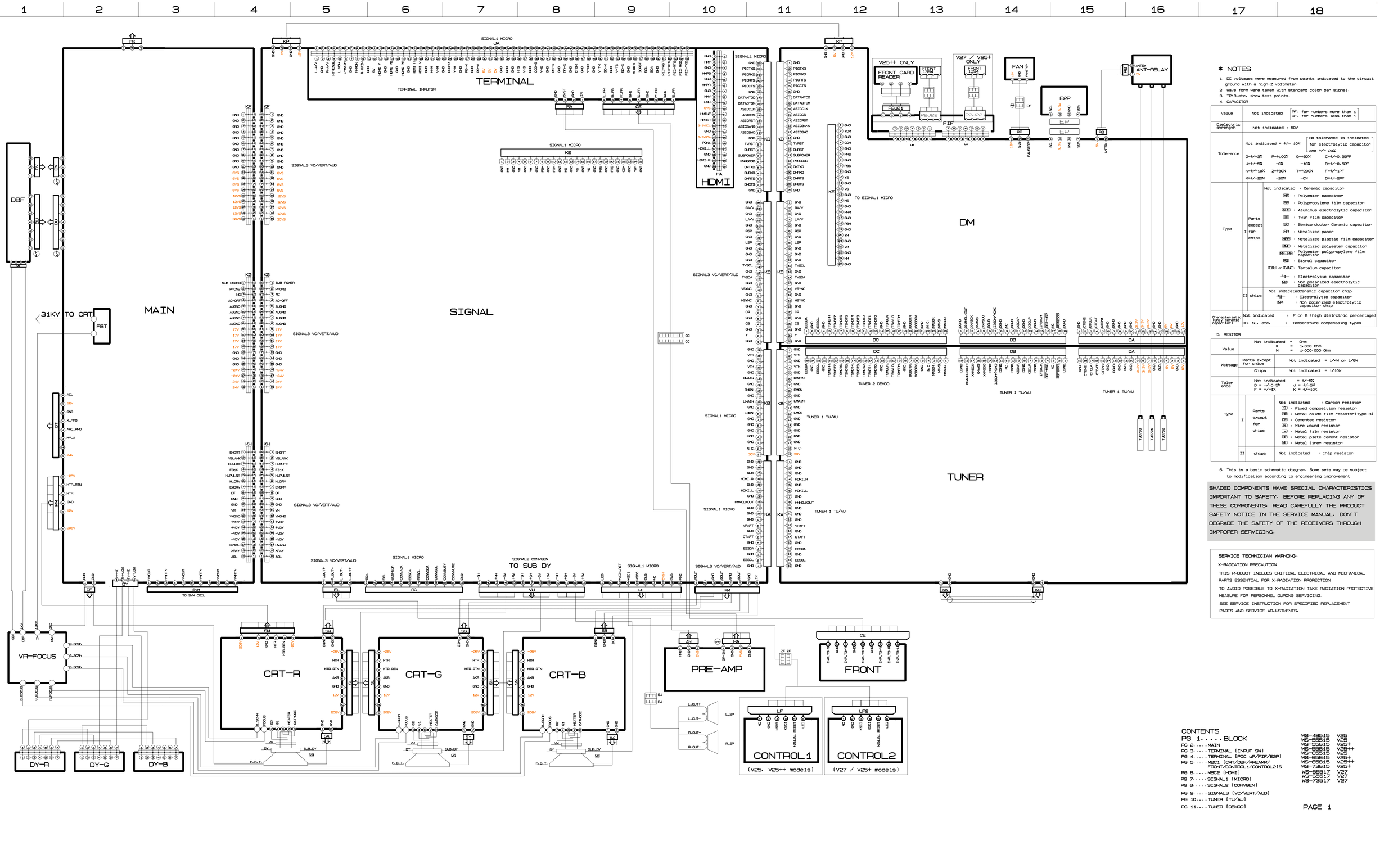


* NOTES

1. DC voltages were measured from points indicated to the circuit ground with a high-Z voltmeter
2. Wave form were taken with standard color bar signal.
3. TP13,etc. show test points.
4. CAPACITOR

Value	Not indicated	PF. for numbers more than 1 uF. for numbers less than 1
Dielectric strength	Not indicated : 50V	
Tolerance	Not indicated = +/- 10%	No tolerance is indicated for electrolytic capacitor and +/- 20%
	G=+/-2% P=+100% Q=+30%	C=+/-0.25PF
	J=+/-5% -0% -10%	D=+/-0.5PF
	K=+/-10% Z=+80% -20%	T=+200% -0% F=+/-1PF
	M=+/-20%	D=+/-2PF
Type I Parts except for chips	Not indicated : Ceramic capacitor	
	MY : Polyester capacitor	
	PP : Polypropylene film capacitor	
	ALM : Aluminus electrolytic capacitor	
	TF : Twin film capacitor	
	SC : Semiconductor Ceramic capacitor	
	MP : Metalized paper	
	MPS : Metalized plastic film capacitor	
	MMF : Metalized polyester capacitor	
	MPC,PP : Polyester polypropylene film capacitor	
	PS : Styrol capacitor	
	TAN or TANT : Tantalum capacitor	
	: Electrolytic capacitor	
	NP : Non polarized electrolytic capacitor	
II chips	Not indicated : Ceramic capacitor chip	
	: Electrolytic capacitor	
	NP : Non polarized electrolytic capacitor chip	
Characteristic (only ceramic capacitor)	Not indicated : F or B (high dielrctric percentage)	
	CH SL. etc. : Temperature compensaing types	

5. RESITOR

Value	Not indicated = Ohm K = 1.000 Ohm M = 1.000.000 Ohm	
Wattage	Parts except for chips	Not indicated = 1/4W or 1/8W
	Chips	Not indicated = 1/10W
Tolerance	Not indicated = +/-5% D = +/-0.5% J = +/-5% F = +/-1% K = +/-10%	
Type I Parts except for chips	Not indicated : Carbon resistor	
	S : Fixed composition resistor	
	MG : Metal oxide film resistor(Type B)	
	CC : Cemented resistor	
	W : Wire wound resistor	
	M : Metal film resistor	
	MP : Metal plate cement resistor	
	ML : Metal liner resistor	
II chips	Not indicated : chip resistor	

6. This is a basic schematic diagram. Some sets may be subject to modification according to engineering improvement

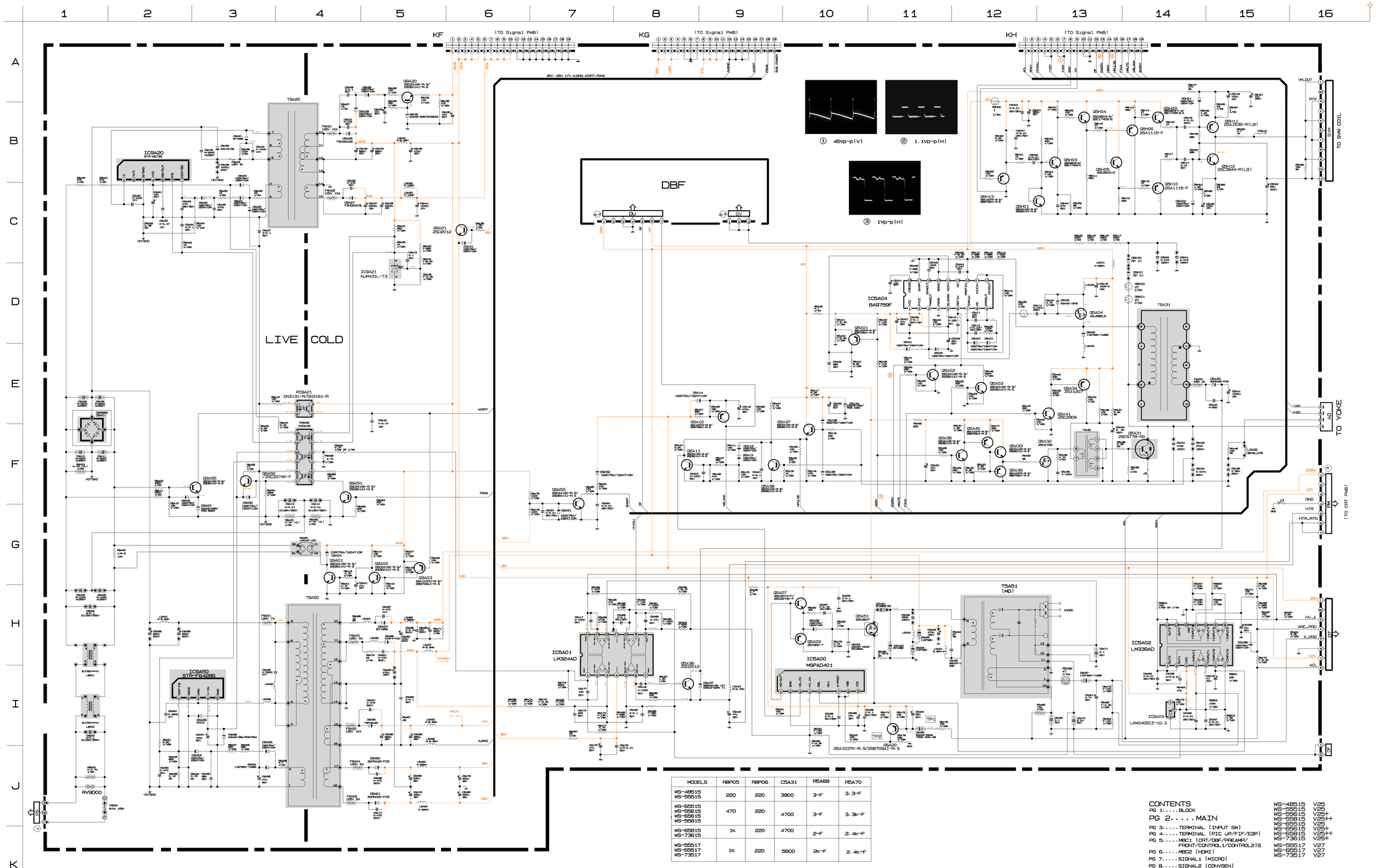
SHADED COMPONENTS HAVE SPECIAL CHARACTERISTICS IMPORTANT TO SAFETY. BEFORE REPLACING ANY OF THESE COMPONENTS, READ CAREFULLY THE PRODUCT SAFETY NOTICE IN THE SERVICE MANUAL. DON'T DEGRADE THE SAFETY OF THE RECEIVERS THROUGH IMPROPER SERVICING.

SERVICE TECHNICIAN WARNING:
X-RADIATION PRECAUTION
THIS PRODUCT INCLUES CRITICAL ELECTRICAL AND MECHANICAL PARTS ESSENTIAL FOR X-RADIATION PROTECTION
TO AVOID POSSIBLE TO X-RADIATION TAKE RADIATION PROTECTIVE MEASURE FOR PERSONNEL DURONG SERVICING.
SEE SERVICE INSTRUCTION FOR SPECIFIED REPLACEMENT PARTS AND SERVICE ADJUSTMENTS.

CONTENTS

PG 1.....BLOCK
PG 2.....MAIN
PG 3.....TERMINAL [INPUT SW]
PG 4.....TERMINAL [PIC uP/FIP/E2P]
PG 5.....MBC1 [CRT/DBF/PREAMP/ FRONT/CONTROL1/CONTROL2]S
PG 6.....MBC2 [HDMI]
PG 7.....SIGNAL1 [MICRO]
PG 8.....SIGNAL2 [CONVGEN]
PG 9.....SIGNAL3 [VC/VERT/AUD]
PG 10....TUNER [TU/AU]
PG 11....TUNER [DEMOD]

WS-48515	V25
WS-55515	V25
WS-55615	V25++
WS-65515	V25
WS-65615	V25++
WS-65815	V25++
WS-73615	V25+
WS-55517	V27
WS-65517	V27
WS-73617	V27



MODELS	R6P05	R6P06	C5A31	R5A58	R5A70
WS-48515 WS-55515	220	220	3900	3-F	3.3-F
WS-65515 WS-65615 WS-65615 WS-65815	470	220	4700	3-F	3.3k-F
WS-65815 WS-73615	1k	220	4700	2-F	2.4k-F
WS-65517 WS-65517 WS-73517	1k	220	5600	2k-F	2.4k-F

CONTENTS

PG 1....BLOCK
PG 2....MAIN
PG 3....TERMINAL [INPUT SW]
PG 4....TERMINAL [PIC UP/FIF/E2P]
PG 5....MBC1 [CRT/DBF/PREAMP/ FRONT/CONTROL1/CONTROL2]S
PG 6....MBC2 [HDMI]
PG 7....SIGNAL1 [MICRO]
PG 8....SIGNAL2 [CONVGEN]
PG 9....SIGNAL3 [VC/VERT/AUD]
PG 10....TUNER [TU/AU]
PG 11....TUNER [DEMOD]

WS-48515	V25
WS-55515	V25
WS-55615	V25+
WS-65815	V25++
WS-65515	V25
WS-65615	V25+
WS-65815	V25++
WS-73615	V25+
WS-55517	V27
WS-65517	V27
WS-73517	V27

TO FRONT PWB

PJ2J00 INPUT 1 INPUT 2

PJ2J03

PJ2J04

IC2K01 CXA2189Q

IC3L01 CXA2189Q

PJ2J05 HDMI AUDIO

PJ2J02 A/V AUDIO OUT

MONITOR OUT PJ2J01

IC2L01 MM1556AJBE

IC2L41 MM1556AJBE

IC3M02 LH1881H

IC2M01 UPD64083

IC2M41 BA7657F

IC2P01 CXA2019AQ/T4

IC2P41 BA7657F

IC2N01 CXA2019AQ/T4

IC2N41 BA7657F

TO SIGNAL1 MICRO

①② 90Vp-p(H)

③④ 2.2Vp-p(H)

⑤⑥ 2.2Vp-p(H)

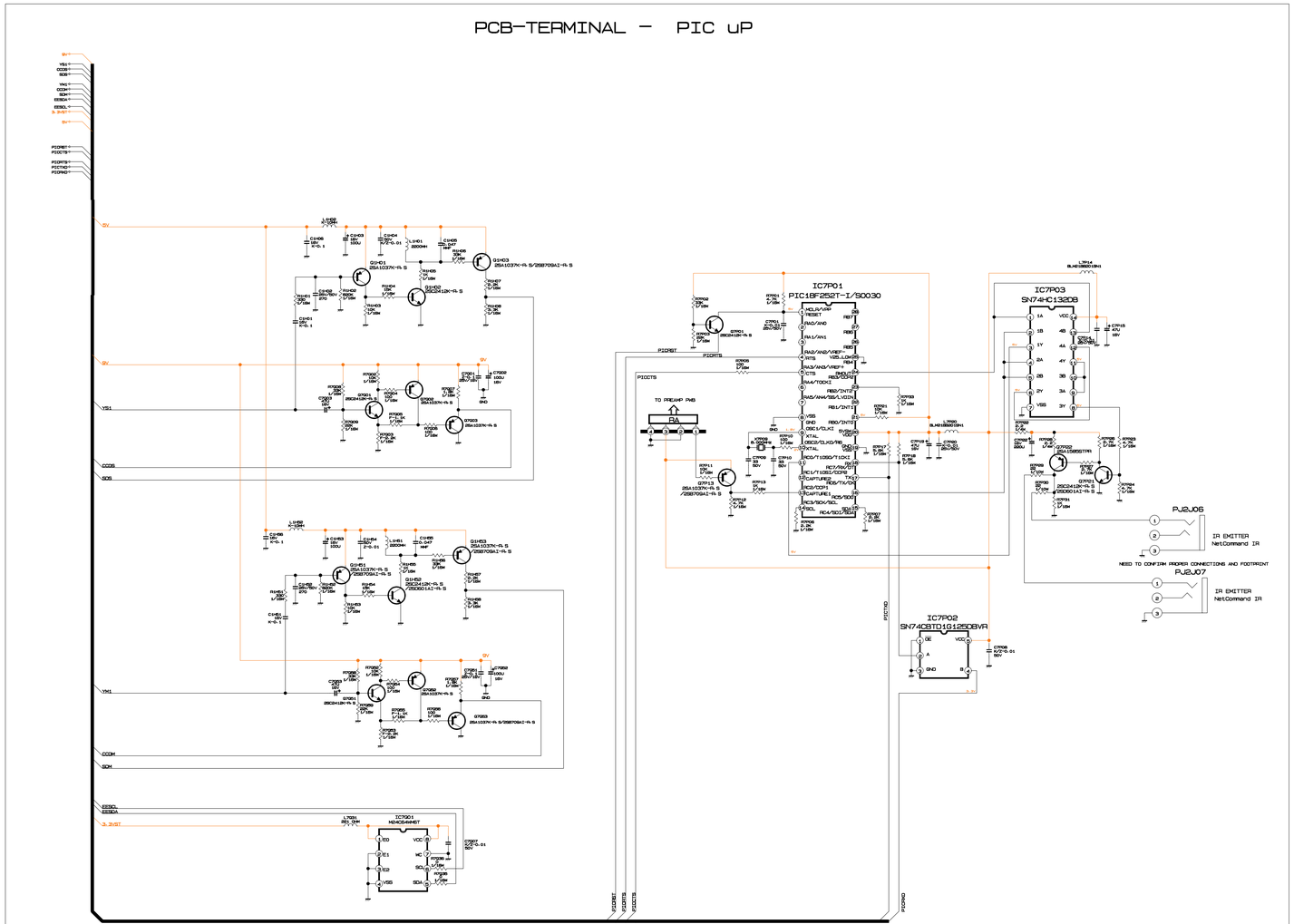
⑦⑧ 2.2Vp-p(H)

CONTENTS

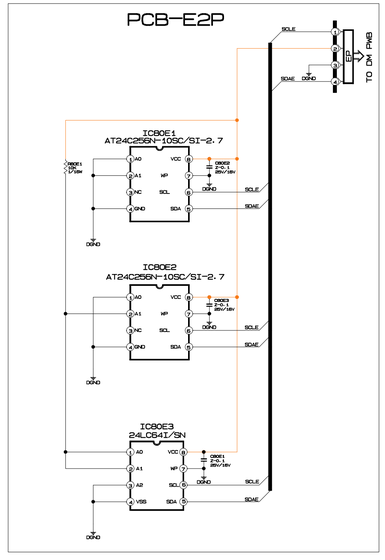
PG 1.....BLOCK
PG 2.....MAIN
PG 3.....TERMINAL [INPUT SW]
PG 4.....TERMINAL [PIC UP/FIF/E2P]
PG 5.....MSC1 [CRT/DBF/PREAMP/ FRONT/CONTROL1/CONTROL2]S
PG 6.....MSC2 [HDMI]
PG 7.....SIGNAL1 [MICRO]
PG 8.....SIGNAL2 [CONVGEN]
PG 9.....SIGNAL3 [VC/VERT/AUD]
PG 10....TUNER [TU/AU]
PG 11....TUNER [DEMOD]

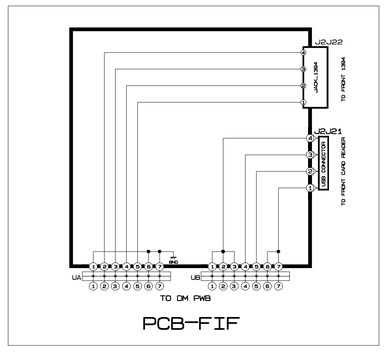
WS-48515	V26
WS-55515	V26
WS-55515	V26A
WS-55515	V26A+
WS-65515	V25
WS-65515	V25A
WS-65515	V25A+
WS-55517	V27
WS-55517	V27
WS-73517	V27

PCB-TERMINAL - PIC uP



PCB-E2P





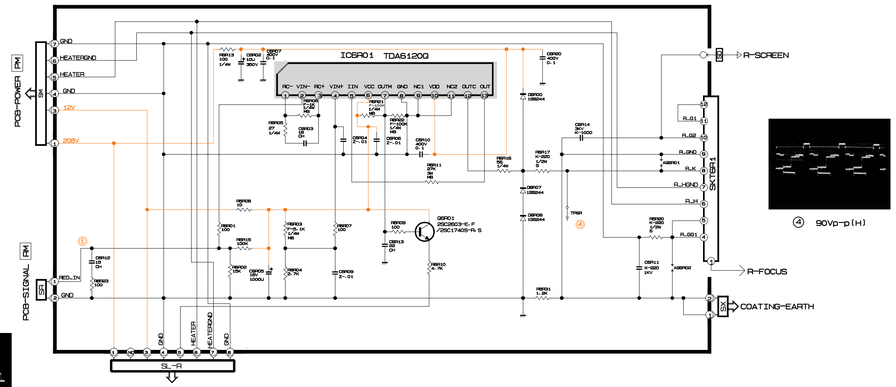
PCB-FIF

CONTENTS

PG 1.....BLOCK
PG 2.....MAIN
PG 3.....TERMINAL [INPUT SW]
PG 4.....TERMINAL [PIC uP/FIF/E2P]
PG 5.....MBC1 [CRT/DBF/PREAMP/FRONT/CONTROL1/CONTROL2]S
PG 6.....MBC2 [HDMI]
PG 7.....SIGNAL1 [MICRO]
PG 8.....SIGNAL2 [CONVGEN]
PG 9.....SIGNAL3 [VC/VERT/AUD]
PG 10....TUNER [TU/AU]
PG 11....TUNER [DEMOD]

WS-46515	V26
WS-55515	V25
WS-56515	V25+
WS-56615	V25++
WS-65515	V25
WS-65615	V25+
WS-65515	V25++
WS-73615	V25+
WS-55517	V27
WS-65517	V27
WS-73517	V27

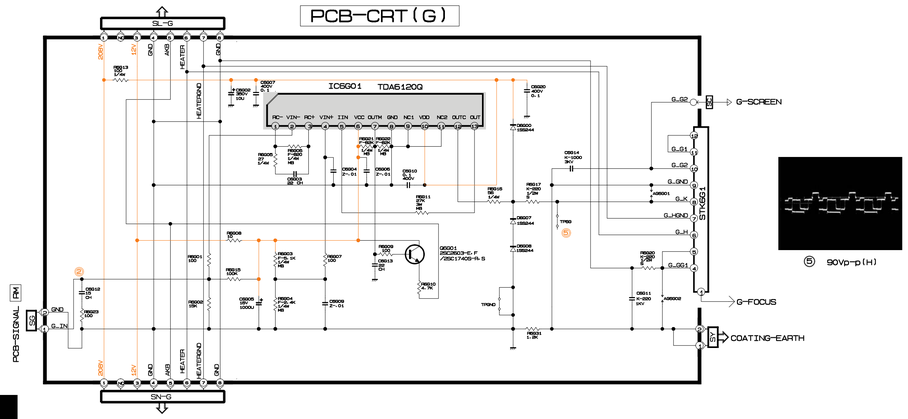
PCB-CRT(R)



④ 90Vp-p(H)

① 2.2Vp-p(H)

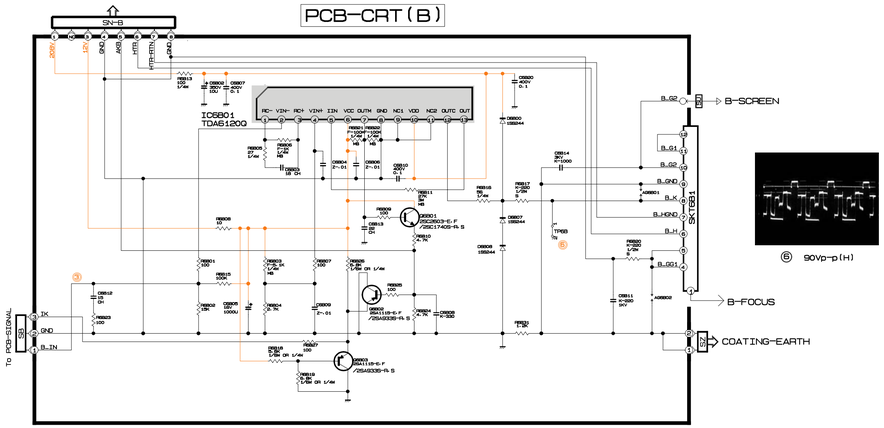
PCB-CRT(G)



⑤ 90Vp-p(H)

② 2.2Vp-p(H)

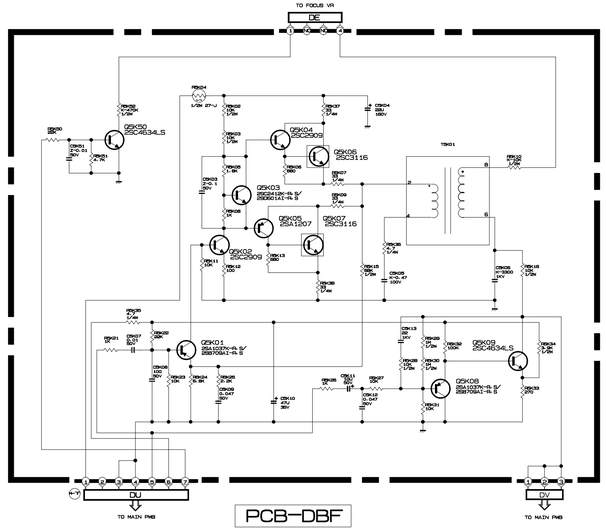
PCB-CRT(B)



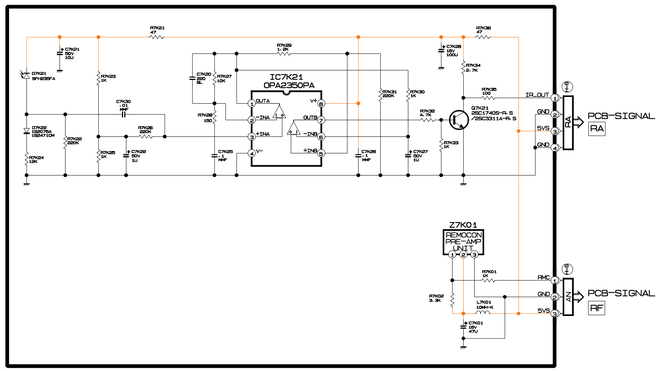
⑥ 90Vp-p(H)

③ 2.2Vp-p(H)

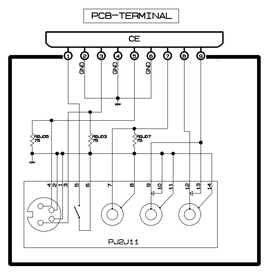
PCB-DBF



PCB-PREAMP

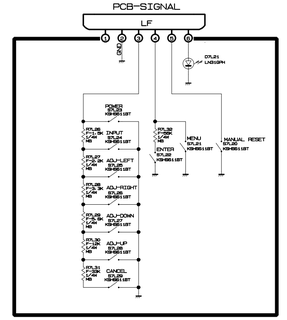


PCB-TERMINAL



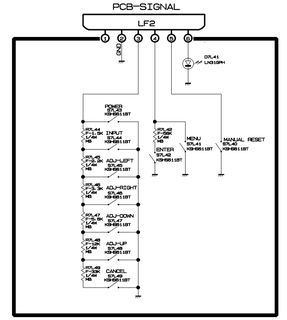
PCB-FRONT

PCB-SIGNAL LF



PCB-CONTROL 1

PCB-SIGNAL LF2



PCB-CONTROL 2

CONTENTS

PG 1....BLOCK
PG 2....MAIN
PG 3....TERMINAL [INPUT SW]
PG 4....TERMINAL [PIC uP/FIF/E2P]
PG 5....MBC1 [CRT/DBF/PREAMP/FRONT/CONTROL1/CONTROL2]
PG 6....MBC2 [HDMI]
PG 7....SIGNAL1 [MICRO]
PG 8....SIGNAL2 [CONVGEN]
PG 9....SIGNAL3 [VC/VERT/AUD]
PG 10....TUNER [TU/AU]
PG 11....TUNER [DEMOD]

WS-48515	V25
WS-55515	V25
WS-55515	V25+
WS-55815	V25++
WS-65515	V25
WS-65515	V25+
WS-65815	V25++
WS-73515	V25+
WS-55517	V27
WS-65517	V27
WS-73517	V27

PIN	Signal Assignment
1	T.M.D.S. Data 2+
2	T.M.D.S. Data 2 Shield
3	T.M.D.S. Data 2-
4	T.M.D.S. Data 1+
5	T.M.D.S. Data 1 Shield
6	T.M.D.S. Data 1-
7	T.M.D.S. Data 0+
8	T.M.D.S. Data 0 Shield
9	T.M.D.S. Data 0-
10	T.M.D.S. Clock+
11	T.M.D.S. Clock Shield
12	T.M.D.S. Clock-
13	CEC
14	Reserve
15	SDC Clock
16	SDC Data
17	Ground (return for +5V)
18	+5V Power
19	Hot Plug Detect
Shell	FG
(20)	Location Post (GND)
(21)	Location Post (GND)
(22)	Location Post (GND)
(23)	Location Post (GND)

IC2000
SiI9993

IC2020
24LCS22AT/SN

IC2010
NDC7002N
N-CH MOSFET

IC2030
CM1210-08MS

IC2040
BA033FP

IC2050
LDO1150PT50R

IC2300
CS4334-KS
I2S D/A CONVERTER

TO SIGNAL1 MICRO

CONTENTS
PG 1.....BLOCK
PG 2.....MAIN
PG 3.....TERMINAL (INPUT SW)
PG 4.....TERMINAL (PIC uP/FIF/E2P)
PG 5.....MBC1 (CRT/DBF/DREAM3/FRONT/CONTROL1/CONTROL2)S
PG 6.....MBC2 (HDMI)
PG 7.....SIGNAL1 (MICRO)
PG 8.....SIGNAL2 (CONVGEN)
PG 9.....SIGNAL3 (VC/VERT/AUD)
PG 10....TUNER (TU/AU)
PG 11....TUNER (DEMOD)

WS-48515 V25
WS-55515 V25
WS-55515 V25+
WS-55515 V25++
WS-55515 V25
WS-55515 V25+
WS-55515 V25++
WS-73615 V25+
WS-55517 V27
WS-55517 V27
WS-73517 V27

ALIGNMENT TEST CONNECTOR

TO CONV GEN

VC/VERT/AUD

EE I2C BUS

5V I2C BUS

3.3V I2C BUS

IC7A00
M306V7FGFP

TO DM BOARD

TO TERMINAL BOARD INPUT/SW

TO TUNER BOARD

TO HDMI BOARD

TO TUNER BOARD

TO DM BOARD

VC/VERT/AUD

HDMI ANALOG VIDEO / SYNC

TUNER VIDEO / AUDIO

ANALOG VIDEO

Preamp Control Board

	Models		
	V25/V27	V25+	V25++
R7A75	YES	YES	NO
R7B75	NO	NO	YES
R7A76	YES	NO	YES
R7B76	NO	YES	NO

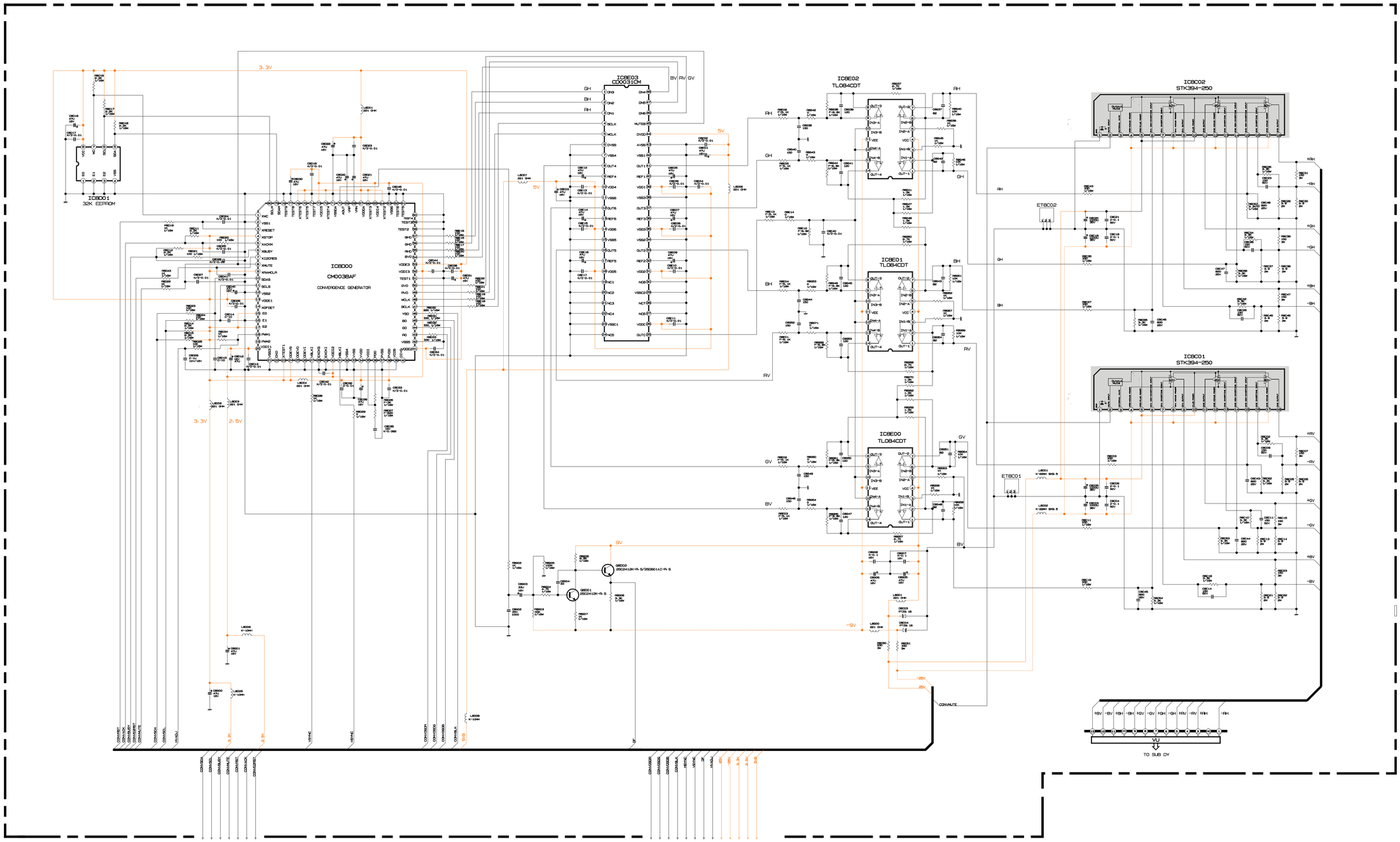
① 90Vp-p(H)

② 2.2Vp-p(H)

③ 2.2Vp-p(H)

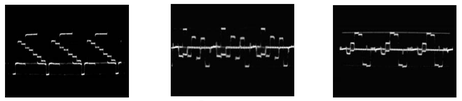
CONTENTS

PG 1....BLOCK — WS-48515 V25 / WS-55515 V25+ / WS-55615 V25++
PG 2....MAIN — WS-55515 V25 / WS-55515 V25+ / WS-55515 V25++
PG 3....TERMINAL (INPUT SW) — WS-73515 V25+
PG 4....TERMINAL (PIC uP/FIF/E2P) — WS-55517 V27
PG 5....MBC1 (CRT/DBF/PREAMP/FRONT/CONTROL1/CONTROL2)S — WS-55517 V27 / WS-73517 V27
PG 6....MBC2 (HDMI)
PG 7....SIGNAL1 (MICRO)
PG 8....SIGNAL2 (CONVGEN)
PG 9....SIGNAL3 (VC/VERT/AUD)
PG 10....TUNER (TU/AU)
PG 11....TUNER (DEMOD)



CONTENTS

PG 1.....BLOCK	WS-485515	V20
	WS-505515	V20
PG 2.....MAIN	WS-485515	V20+
	WS-505515	V20+
PG 3.....TERMINAL [INPUT SW]	WS-485515	V20++
	WS-505515	V20++
PG 4.....TERMINAL [PIC uP/FIF/E2P]	WS-485515	V25
	WS-505515	V25
PG 5.....MBC1 [CRT/DBF/PREAMP/ FRONT/CONTROL1/CONTROL2]S	WS-485515	V25+
	WS-505515	V25+
	WS-735515	V25+
PG 6.....MBC2 [HDMI]	WS-505517	V27
PG 7.....SIGNAL1 [MICRO]	WS-485517	V27
	WS-735517	V27
PG 8.....SIGNAL2 [CONVGEN]		
PG 9.....SIGNAL3 [VC/VERT/AUD]		
PG 10....TUNER [TU/AU]		
PG 11....TUNER [DEMOD]		



① 1Vp-p(H)

② 1Vp-p(H)

③ 1Vp-p(H)

TO CRT PWBs

TO SPEAKERS

CXA2150AQ
IC2V00

IC4B01
TDA8177

IC3E01
LA4663

IC9C05
BA05SFP

IC9C41
LD2915DT50

IC9C61
LD2915DT25

IC9C21
LD2915DT33

IC9C04
BA033SFP

IC9C01
BA05SFP

IC9C02
BA05SFP

IC9C03
BA05SFP

TO MICRO

TO CONV-GENE

TO MAIN PWB

TO DM PWB

TO DM PWB

TO MAIN PWB

TO MAIN PWB

CONTENTS

PG 1....BLOCK
PG 2....MAIN
PG 3....TERMINAL [INPUT SW]
PG 4....TERMINAL [PIC uP/FIF/E2P]
PG 5....MBC1 [CRT/DBF/PREAMP/FRONT/CONTROL1/CONTROL2]S
PG 6....MBC2 [HDMI]
PG 7....SIGNAL1 [MICRO]
PG 8....SIGNAL2 [CONVGEN]
PG 9....SIGNAL3 [VC/VERT/AUD]
PG 10....TUNER [TU/AU]
PG 11....TUNER [DEMOD]

WS-48515	V25
WS-55515	V25
WS-55515	V25+
WS-55515	V25++
WS-65515	V25
WS-65515	V25+
WS-65515	V25++
WS-73615	V25+
WS-65517	V27
WS-65517	V27
WS-73517	V27

TO DEMOD-2

TO/FROM DM BOARD

TO/FROM SIGNAL

TU8700
ENM4891-4P4A

TU8704
TUM90FR-A103-NT
MAIN NTSC DEMODULATOR

IF BUFFER

COAX CABLE

IC8708
LD2931SDT50

IC8721
BA05FP

TU8702
ENV56D3863
OOB

TU8701
ENG36630G

IC8720

IC8719

IC3002
CS4334-KS
I2S D/A CONVERTER

IC3006
NJM2824

IC3007
NJM2824

IC3004
MSP 3445G QI-B8-V3

IC3003
M33202D

IC3005
TC74LVX14FT
I2S BUFFER

MONITOR AMPLIFIER

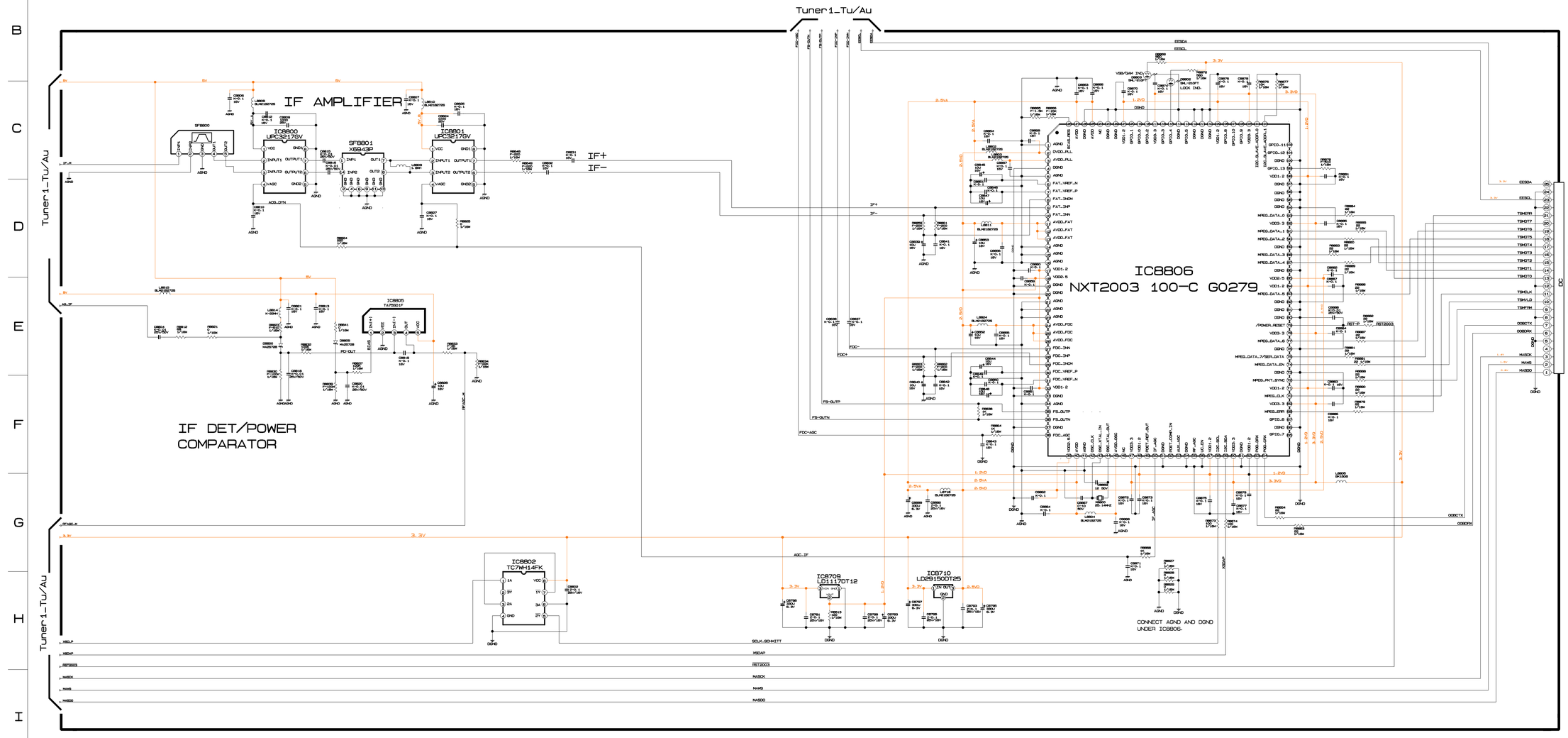
① 1Vp-p(H)

② 1Vp-p(H)

To Page 2 (Demod)

CONTENTS

PG 1....BLOCK	WS-48515	V25
PG 2....MAIN	WS-55515	V25
PG 3....TERMINAL [INPUT SW]	WS-55515	V25+
PG 4....TERMINAL [PIC uP/FIF/E2P]	WS-55515	V25++
PG 5....MSC1 [CRT/DBF/PREAMP/ FRONT/CONTROL1/CONTROL2]S	WS-65515	V25
	WS-65515	V25+
	WS-65515	V25++
	WS-73515	V25+
PG 6....MSC2 [HDMI]	WS-65517	V27
PG 7....SIGNAL1 [MICRO]	WS-65517	V27
PG 8....SIGNAL2 [CONVGEN]	WS-73517	V27
PG 9....SIGNAL3 [VC/VERT/AUD]		
PG 10....TUNER [TU/AU]		
PG 11....TUNER [DEMOD]		



CONTENTS

PG 1....	BLOCK	WS-48515 V25 WS-55515 V25
PG 2....	MAIN	WS-55615 V25+ WS-55815 V25++
PG 3....	TERMINAL [INPUT SW]	WS-65515 V25
PG 4....	TERMINAL [PIC uP/FIF/E2P]	WS-65615 V25+
PG 5....	MBC1 [CRT/DSP/PREAMP/ FRONT/CONTROL1/CONTROL2]S	WS-65815 V25++ WS-73615 V25+
PG 6....	MBC2 [HDMI]	WS-55517 V27
PG 7....	SIGNAL1 [MICRO]	WS-65517 V27
PG 8....	SIGNAL2 [CONVGEN]	WS-73517 V27
PG 9....	SIGNAL3 [VC/VERT/AUD]	
PG 10....	TUNER [TU/AU]	
PG 11....	TUNER [DEMOD]	